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ABSTRACT

These proceedings contain 12 presentations from a conference which focused on forecasts of jobs in the 1990s and into the 21st century. The keynote address (Marvin Cetron) shows the need for reform in the American education system with illustrations drawn from the economic and employment situations in foreign countries. He makes predictions of economic trends and suggests improvement in the areas of educational level, training for computer literacy, and increased teacher salaries. Five corporate executives (Fred Buck, Norman Bliss, Randolph G. Coleman, Arden Bement, and Allen Olgiate) discuss current and future employment in their respective fields: health care, entrepreneurship, services industry, industry, and high technology industry. Three educators (Larry Coon, Ronald Zambetti, and Lewis Patterson) describe the state of the art in industrial training within McDonald's, directions that two-year institutions in Ohio are taking to respond to students' educational needs, and ways that colleges and universities are planning for the future. Three representatives of Ohio Governor Richard F. Celeste (Gary Holland, Roberta Steinbacher, and Ray Lorello) outline the "strategic plan" for putting Ohioans back to work. (YLB)

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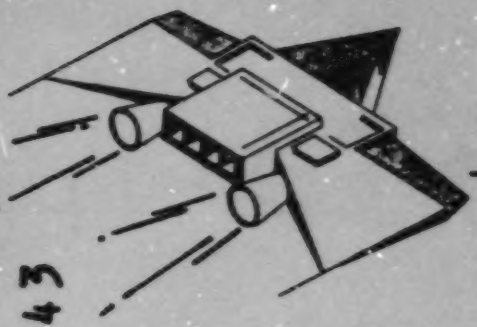

FUELING THE EDUCATION EXPLOSION

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PROCEEDINGS
OF
CONFERENCE 3:

CAREER OPPORTUNITIES FOR THE FUTURE

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
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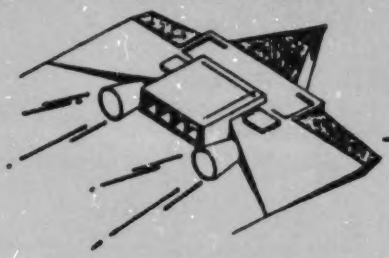


BACKGROUND

The FEE Organization (Fueling the Education Explosion) is a non-profit coalition of volunteers and sponsors whose purpose is to assist Ohio youth in the future.

The project is designed to address the fact that the pace and types of change in our society have created a unique opportunity for public schools to take the lead in determining how to educate children for the future. As we face the prospect that many educational practices and programs are failing to meet the needs of today and tomorrow, there is room for optimism about meeting the challenges of change.

The FEE conference topics are planned to help us understand what the future will be so that we can anticipate and shape the changes. As school and community leaders, we can begin to see ourselves developing and determining what the trends in education should be in 5 years, 15 years, and into the 21st century.

Important ingredients for achieving the project's goals are: current information and knowledge from recognized thinkers, futurists, inventors, communicators, scientists and educators; planning techniques and strategies that include creative/productive thinking; and networking, so that each district can become a resource for the whole group.

Most important and necessary to the project are the participants. The design calls for teams to represent a school district or other organization. For example, a school district is encouraged to send a team of three to five members, who might include the following: superintendent, school board member, principal, teacher and community representative.

These teams operate in various ways. During conferences, small groups composed of three to five teams focus their planning efforts on common needs, goals or problems. Each group has a leader and a recorder trained specifically to help participants use the problem-solving and inventive reasoning methods in the project model.

Between conferences there is a continuing exchange of information and support among the school district teams regarding the progress, success and failure of their specific projects. Dissemination and networking are enhanced by the published proceedings of each conference.

Participants are encouraged to evaluate all parts of each conference and to give suggestions for additional topics to be addressed though the project.

The first conference, "Ignition!", was held on May 5 and 6, 1983, and was attended by 200 representatives of school districts and communities throughout Ohio. Costs were underwritten by sponsors who provided sites and facilities, by volunteers who donated planning and implementation time, and by the fees paid by participants. Costs of preparing and disseminating the conference publication were underwritten by The Standard Oil Company (Ohio) and The Martha Holden Jennings Foundation.

Conference 2, "Intelligence and Schooling", was held November 17 and 18, 1983 at Cleveland State University. The three major topics were real-world intelligence, artificial intelligence, and linkages between the education and corporate sectors.

On March 29 and 30, 1984 at Conference 3, "Career Opportunities for the Future", conferees heard forecasts of jobs in the 1990s and into the 21st century. A panel of executives in health care, industry, technology, engineering and entrepreneurship discussed current and future employment in their respective fields. And representatives of Governor Richard F. Celeste outlined the "strategic plan" for putting Ohioans back to work.

Conference 4, "High Technology and Education", will be held September 20 and 21, 1984. This exciting conference will include demonstrations of and hands-on experience with computers and robotics, satellites and communications, and bio-technologies and lasers. Conferees will learn the future plans of NASA and will hear Dr. Richard Byrne speak on education and the communications revolution.

The concluding conference in the series, to be held in May 1985, will call for conference participants to share the impact of the FEE project on their school systems or organizations.

Proceedings of Conferences 1, 2 and 3 are available for $5 each.

DR. MARVIN CETRON

I want to cover a couple of major areas in a short period of time. Let me begin with an important question: why are we 17th -- or third from the bottom -- of 20 industrialized countries in the education business? It's absolutely horrendous. Our education is conspicuous by its absence. And it's not only the students that are no good. The teachers leave something to be desired as well. Teaching is the curriculum of last resorts. We have 17 million people in this country who can't read at all and 46 million who can't read at the third grade level, can't draw an inference, can't make an analogy, don't know how to solve a problem, and don't know what a ratio or a percentage is.

When 66 percent of the future math teachers graduating from Florida A & M flunk the high school mathematics examination because it uses reading questions, you know you've got a problem. When two years in a row the SAT scores of those kids going into the military were higher than those going into teaching, you know you've got a problem. When in 40 of our 50 states the garbage collector has a higher starting salary than the teacher, and when three to five percent of our teachers get paid less than $9,000 and are entitled to food stamps, you know you've got a problem. What you get for nothing is worth it. And that's what we've got in our education system.

And don't accept the argument that we educate everybody. That's not true. We try to educate everybody, but so do Sweden, Norway, Denmark,

Germany, Finland, and everybody else. Okay, a few don't. In Russia if you don't do well on the three exams you become a borscht dipper. In Japan, too, only some people are educated. But in most of the industrialized countries that isn't true, so let's not give ourselves excuses. The educational system needs a complete overhaul.

One area in need of reform is the number of hours students spend in school. We have our kids going for 180 days, not 240 like most industrialized countries; our kids attend school six hours a day, theirs go eight. Their kids have an hour and a half of homework a night; ours have an hour and a half a week. That's pretty stupid. I was a consultant to the Excellence Committee Report and I've worked on ABC Night Line and two other programs with Education Secretary Bell and the truth is, all they looked at were the overall problems we have, and not the societal implications of making the necessary changes. What do you do when you go to 210 days and seven hours a day? Who pays for the 32 percent more hours? You're going to have to pay the teachers. What happens when the three most important reasons for teaching no longer exist: June, July, and August? No one is even looking at what this means. What does it mean when our kids are in school seven hours a day, 210 days a year, and we have 12 percent more women in the work force because now the schools babysit their kids? But the big issue that the President talks about is more money for private schools. We need more money for public schools, not private. When you do go to 210 days, seven hours a day, you get 22 percent more students transferring from the private schools to the public schools because then the schools babysit their kids like the private schools do today. None of the social issues are even being looked at.

At the same time these changes are being contemplated, we are undergoing a major revolution. The four key words came from my professor in 1948. (At that time I thought he was a little over the hill but he was way ahead of everybody.) He had four words written on the board: Innovate, Automate, Emigrate, Evaporate. They are four words that everyone in the business

community ought to understand. Now the word innovate I would change to motivate. If you can't get the workers to work with you, if their personal goals aren't corporate goals, if you can't get them to build on each others' strengths, forget the union regulations and do the work that has to be done so you can become more efficient and compete, then you automate. You'd better go robotic: computer-aided design, computer-aided manufacturing, flexible manufacturing cells.

When those two things aren't working, then you emigrate. You go overseas, see who you can co-manufacture with, or have the product built overseas and bring it back over here. When that doesn't work, it's called evaporate. What my professor meant by that was to hire a good lawyer and make money when you go out of business. Well that's changed. Today you sell to the union and let them go out of business. I'm not kidding.

I'm talking about five industries: automobiles, steel, textiles, rubber, railroads. You've got four of the five in Ohio. There are 1.2 million people in this country who won't get their jobs back anymore; eight hundred thousand because of automation. That's the robotics and computer-aided design and manufacturing, flexible manufacturing cells and computer system manufacturing. The other four hundred thousand won't get their jobs back because nationalized countries are dumping their goods here and because of low-wage countries. You can't compete with Sri Lanka, Cambodia, Indonesia; you can't compete with $300 a year. That would put even the Hong Kong tailor out of business. So we're talking about a major change.

You're probably wondering why I'm up here talking to educators when I'm not even an educator. I'm here as a person who is going to hire the people coming out of the educational system and use them as productive members of society. But except for the last year and a half or two, we're not getting a good product. We're getting people who can't read; we're getting people who can't write; we're getting people who can't solve a problem; we're getting people who don't know what's going on.

There are two people I blame for this. One is Dr. Spock, with his attitude of "Let the child do his own thing, let him set up his own program, let him get his own credit, let's have pass-fail grading." We had a bunch of flakes come out of school for 20 years. They were all going to wear long hair and be different from everybody else and they were not going to listen to anybody over 30. And they weren't good workers. They were looking for something for nothing. Who's to blame? Us. We did it. We wanted our children to have it better than we had it, so we tried to make it easier. That's ridiculous. A child who doesn't know what's required of him later on is not old enough to make up his own program. So it's our fault.

I also blame the Harvard Business School. That bottom line, bottom line, bottom line business kills us. When you go bottom line too long all you worry about is the balance sheet and how you look right now. You don't fund research and development, you don't fund education, and you don't fund training, because they have long-term payoffs. If it isn't going to benefit me this year, why should I fund it? That's crazy. The old American innovativeness is gone. The inventiveness is just about gone. The four I's -- ideas, inventions, innovation, imitation -- used to be our strength. We're not funding them anymore because they don't make our bottom line look good. The Harvard Business School mentality has taken over our corporations, and that's one of our problems. So between the educational system putting out junk, and our business community looking for today's payoff, we've done nothing. We've got to make some changes, and it will take everybody's cooperation.

So why am I telling you what those changes should be? The reason is that at Forecasting International we did some work and a lot of that work was correct. We predicted the problems in Iran four years before they took place. We predicted the problems that took place in Poland four years before they happened, and the energy embargo six weeks before it occurred; we predicted the Afghanistan invasion and told the CIA about it. The reason they didn't already know it would happen is they're measuring the wrong thing. We got

involved because we had published information specifically about these problems before they existed. Our computerized data bank is what gave us the information.

I worked with the Navy for 20 years and retired from there. I spent ten years directing all 16 Navy research and development laboratories and the whole research and development program. And what I discovered was that a lot of the models being used to determine what countries are most and least stable, and some of the information on war games just was not very good. So I left and we started our own business and looked at the world from a different point of view. And I found out that if we measured the right indicators, we could tell that Iran was unstable and that the problems in Poland were grave. We needed computer capability, there's no question about that, but we also needed to measure the right indicators. Otherwise the analysis wasn't going to make any sense.

The reason we got involved with the stability of other countries was that 76 of our top 200 corporations want to go overseas. They can't make it by innovating or motivating and they can't make it by automating. And these corporations want to know what countries are most stable, where they can get their money back, how often certain countries are going to change their regulations, whether they can co-manufacture and so on. That's when we began to look at political stability, and we found out that the indicators being used were absolutely incorrect. Everybody was looking at per-capita income: what's the average person getting paid in that country? That's stability, right? No, it's not. If you want to know if a country is stable enough to invest in, you want to know what the upper tenth of the population is getting paid and what the bottom tenth of the population is getting paid, and how many times different the two are. In Scandinavia, Sweden, Norway, Denmark and Finland, the upper tenth of the population is making two and a half times what the lower tenth is making. In Europe it's eight to nine times. In the United States, it's ten to eleven. If it's less than 15, you haven't got a problem. Go above 15 and you're in trouble. In Iran the variance between the upper tenth and the bottom tenth was 38 times different.

That's like having your head in the refrigerator and your feet in the oven. Sure, your average temperature is fine, but you're going to die. It's the same thing with countries: you're looking for vital signs.

Another thing everybody looks at is total military budgets. That tells you if they can defend themselves. It's not a good indicator when you're looking for the stability of a country. The number of tanks per mile of border isn't even a good indicator. Throw weights of missles, number of ships: garbage. It's good for defense planning. I worked with war planning like that. But to determine if I want to invest, there's one indicator I want to get in a hurry. Have they doubled their officers corps' salary in less than two years? If so, they're buying the loyalty of their troops. They know they've got troubles. That's what happened with Iran.

Everybody talks about unemployment. Sure employment's important. That's like asking if you have blood pressure. If you have none you're dead, but that's not a good indicator. If you want to know if a person's in trouble, you look at white count. Is there an infection? The white count you take of employment is males between 18 and 28 who are educated and unemployed and living in the city. They can't go back home and be a farmer, or a shepherd because they're embarrassed; they've been educated. So they stay in the city with no job, no food, no clothing, no shelter; they can't even provide for a wife or a girlfriend. So what do they do? They take over the American embassy. That's what happened in Iran.

The question is how to measure what's going on. How do you look at these things? Everybody knows what you look at: is the press controlled? is it monitored? is it a free press? That's fine, it's a good indicator; it's one of the 64 we use. Another one is how a country handles dissidents. If you have a group out there yelling and screaming, "The government's no good, it's rotten", what do you do with them? In Iran, Iraq, and Brazil they are shot. It gets rid of the problem. Argentina puts them in jail. Mexico's got a great socially acceptable way of handling a dissident. You're

out there yelling "the government's no good, it's rotten", and they say "You're absolutely right, come in and join the government -- we'll triple your salary" and they cut off his telephone. It's called getting him out of the traffic pattern. So how countries handle these things becomes important.

Now the reason I give you these indicators is that they are what we use to determine a country's stability. Next you look at trends. Because from the indicators all we get is where we are today. We also must know where we're going to be in five to ten years, ten to twenty years, and after twenty years. Why is our book different and I think better than something like Megatrends?* Because Megatrends counts numbers of lines of newsprint. But numbers of lines of newsprint only tells you how important a trend is. That worked when it was started during WWII. There were only a couple of newspapers in every country and their job wasn't to sell newspapers, but rather to inform. Therefore, counting the lines of newsprint a story got made sense. Now we sell newspapers not to inform the U.S., but to make money. So if a story sells, everybody else copies the story and makes it bigger. Therefore, we get more lines of newsprint.

Secondly, there are no events in Megatrends. We have 3,500 major events, including the probability of their occurrence in five years, ten years, or twenty years, and the impact if they do occur. There's nothing in Megatrends that talks about indicators of various countries because if it doesn't appear in print, you can't write it up. Megatrends talks about ten trends, seven of which we agree with. On three we have some great differences. And some things of importance are not there. Education is crucial. Yes, we've got a problem of energy; it's a scarce resource and everybody knows it. But it's not as important as some other trends are. It's not as important a problem as fresh potable drinking water. Water is a bigger problem than energy.

Our most important product, and the one they left out completely in Megatrends is our kids. They're our scarcest resource. Education is a long-term

*Naisbitt, John, Megatrends: Ten New Directions Transforming Our Lives. New York: Warner Books, Inc. 1982.

payoff and we aren't doing anything about it at all. We're worried about teachers and the National Education Association and we're worried about our school board and our money. We're worried about everything else; we just aren't worried about the kids. That's where it's supposed to be. Teaching. That's our scarce resource.

One of the chapters in the book Encounters with the Future had to do with religion -- it's one of the few chapters cancelled because people didn't like the results. The Presbyterians got upset when they found out there were twice as many Moslems as Presbyterians in the U.S. The Catholics got upset when 40 percent of Catholic youth were intermarrying in 1980, so they didn't like the results. The Jewish group with 33.7 percent of the kids intermarrying didn't like the one percent increase. The Moral Majority really got upset when we said the Moral Majority was neither moral nor a majority. We got a call from Mr. Falwell. We wrote on all religions: on Buddishm, Mshinto and Taoism, even Maoism in China. We found out the Chinese are working on a different concept. You get up early in the morning, work until late at night, and you're working not for yourself but for your children and your grandchildren. They're gonna have it, not us. They believe that the most important jewel in their crown is education. It's crucial. Everything else can be taken from you, but no one can take what you have in your head. They believe that the family is sacred and they have a patriarchal society. I asked whether this is part of Buddism? Shintoism? Taoism? What are we talking about here? The fellow said "Let me look in the book." It's a great big book. And he said, "I found out what the concept is, we have it here in China." I said "what is it?" He said "In English it's called the Protestant Ethic." It's died in the U.S. and living and doing well in China!

We've forgotten what we're here for. We're looking for immediate gratification. You can't get it -- it takes time. You can't open up a kid's head and dump the education in it. He's got to do it himself. You can't make it too easy, either. She must have a structured background. You've got to look at what these things really mean. We use, as I've said, 3500 events; we use 200 trends, and we use 64 indicators for each country.

Now what have we found out? We found out Germany's going to get reunited about 1990, give or take a couple of years in either direction. The reason? Look at the indicators. In 1973, three percent of the population was called "greens". What was their major complaint? These were young kids who said "I don't want to be a nuclear battlefield. A pox on both your houses, East and West. You guys (meaning Russia and the U.S.) better talk to each other, because we don't want missles on either side." What can three percent of the population do? Three percent couldn't do much. But in 1980, with 18 percent, they had a lot of force and by 1981 with 21 percent they threw Helmut Schmidt out and put Helmut Kolh in. Now they have 23 percent. And they're giving $3.2 billion to the East German government to build propulsion plants for the Rabbit so they can build the rest of the automobile and sell it to the other countries behind the Iron Curtain. They want to become head of the Third World non-aligned countries.

Russia says, "Wait a minute. We've had two major wars, twice you guys came in here and we rearmed. Before we jump into something like reunification, we want to know how to control these guys and what's in it for us." What's in it for the Russians? First of all, denuclearized area. The underbelly of Mother Kussia, the Ukraine, is denuclearized. The second thing is the end of NATO. That's worth looking at a second time, they say. The end of the Warsaw pact also. Why is it the end of NATO if Germany gets out of NATO? It's the only fighting force in Europe. The British have the will to fight; they have no equipment. The French have the equipment and no will to fight. The Dutch have a union -- they vote to go on maneuvers. Can you imagine voting during a war? When you lose Germany, you've lost it. And that's the way it is.

So Russia is saying, "Wait a minute. Let's take a look at this again. It may be worthwhile, but how do I control a reunified Germany?" Well, it's pretty obvious. First you put a natural gas pipeline in, because they have no energy sources at all, and then you put up an oil pipeline. That's how we controlled them during WWII. We blew up the oil fields in

Rumania. No POL -- petroleum, oil or lubrication. So why does our State Department think like lawyers living in the past, not the future? Why do they have a reactive capability? An elevator problem -- the elevators don't go to the top. They're trying to keep Germany and Russia and the rest of the countries from building a pipeline. What are we, crazy? How can we keep them from doing what they're going to do on their own? All we did was keep a lot of jobs for Caterpillar from taking place and make sure our pump manufacturers manufactured the best stuff and couldn't sell it at all or sold it to third rate countries. We put ourselves out of business. We aren't too heavy topside. What we should have said is, "Okay, if they're going to reunite, let's put a pipeline in from Rotterdam, in Holland, into Germany." And you pump the oil back in it, and they turn off the spigot in Russia. Or open up a great big port in Hamburg where you can put the stuff in directly from East Germany back into West Germany. But that thinking is too far forward. They think in the past, not the future. Our hindsight's better than our foresight by a damnsight. You've got to look to the future in these things.

Look at Japan. Everybody's running over to Japan saying, "My God they've got participative management!" Participative management and zero defects and quality circles started in the U.S. military in 1957, called the zero defect program. It took ten years for them to be used by the major corporations in this country, specifically, Western Electric, Bell Laboratories and AT&T. They're the ones who started it. And after it started in our companies the Japanese picked it up and now we think they're brilliant. It's ours, not theirs.

Japan went robotic. Where the hell did they get the robotic information from? From Unimation in Connecticut and from Cincinnati Millicron. From Unimation they picked up the electronic information, from Cincinnati Millicron, the heavy machinery and the hydraulic information to build robots. They still couldn't put it together. They had to go to IBM to help make their robots, which would kill us in productivity. If you take a look at the Excellence Committee Report that was put out, you learn that 52 percent of all

the Ph.D.s in this country are foreigners. Thirty-four percent of all our Master's students are foreigners. And we say, "How come they're stealing our technology?" They're not stealing it -- we're educating them, we're training them, they write a Master's thesis or they write a doctoral thesis. We make sure they're good and then we say, "Now you're good enough to go back home and take our technology with you. And in case you've forgotten something, get hold of the National Technical Information Service. We've structured the information, we'll sell you the reports and you'll always keep up to date with what's going on so you can beat us technologically. Thank you very much for coming. Good-bye." That's what we do.

Japan today has the whole business, and Japan is not the leader. If you take a look at the four I's -- Ideas, Inventions, Innovation and Imitation, they haven't gotten the Nobel prize. We weren't too great either between 1900 and 1930. We were sixth competing with Sweden, Switzerland, England, Germany and France; they were the leaders in Nobel prizes. We didn't do scientific research at that time. We were inventive. We've been the best in inventions since 1600. We're even losing that because inventions have a long-term payoff and inventors can't get venture capital because after all, it's not going to help my balance sheet this year. But that's got to change.

The big high technology during WWI was chemicals and pharmaceuticals. So when we went to war in 1914, Woodrow Wilson got a letter from the American Chemical Society that said, "Don't worry, Mr. President, we're right behind you. We're right here to give you any help and strength you need." And President Wilson wrote back, "Thank you very much. I don't need any help from the American Chemical Society. I already have a chemical engineer at Edgewood Arsenal." He had one engineer in the whole damn military. But that was okay, he felt he knew what he was doing. That was the difference at that time.

From 1930 to 1960 we won 38 Nobel prizes. But the language of science was called broken English. The people who won those prizes all came

from overseas. Since 1960 almost all the prizes are ours. The reason: Nobody can afford the amount of money we spend on high technology and research. The trouble is we give it all away. And we're giving away our birthright. We can't compete with the rest of the world man for man or in salary; we've got to compete with them by being smarter. That means R & D and it means technical jobs. And every single technical job you get means seven more. I'm talking about jobs such as robot technician, laser technician, computer-aided design technician, computer-aided manufacturing technician, hazardous waste disposal technician, flexible manufacturing technician, geriatric social worker, paramedic, housing rehabilitation technician, CAT scan reader, PET scan reader, emergency medical technician, holographic inspector -- none of those titles is in the Dictionary of Occupational Titles or the Occupational Handbook. That's what's put out by the Bureau of Labor Statistics. They give us garbage. It's not GIGO, garbage-in-garbage-out. It's garbage-in-gospel-out, because the government puts out that book. It's still garbage. The Dictionary of Occupational Titles has titles from 1750. Tea taster is there. But they haven't got the new ones. We can't even train people for the new ones because we haven't got a job we can train them for. Once it's a recognized job, it takes ten more years until the universities set up a program. And then two or three more years to get it approved because after all, they know what's best for everybody else -- after everybody else has it. Like politicians, they're not leaders, they're followers. So we've got some major problems.

Technology doesn't happen in medicine, electronics, bionics, or even biology or electronics or electrical engineering. It happens where two or three technologies come together. That's great for outside, but it's horrible for a college. Because after all, the professor's got tenure in medicine. He's sitting at a desk. He's not going to work in bionics. His attitude is "That's my turf buster, and don't you dare touch it." So we don't give the people in medicine anything else because they're in medicine. It even took the psychiatrists in medicine to look at pharmacology. And now most of the things are done by drug, not by talking about it. The point is that innovation happens where technology comes together and where you get

a good university putting technology together. At the University of Utah you have biomedical engineering and bionics, you've got the artificial heart, the artificial spleen, the artificial kidney, artificial arms, artificial hands, artificial fingers; and they're using biofeedback and microchips to move this stuff around.

How come they're all in Utah? New Jersey had all the 15 major firms in pharmaceuticals: Smith Klein and French, Johnson and Johnson, Ciba Geigy, all of them. They were all there. They all left because the education system started to smell bad. They didn't pay their teachers. So the companies kept their headquarters and moved out to California. Now they're all leaving California for Utah, Bionic Valley, because it's where things happen. We must get people to work in the future, not in the past.

Now everybody is running to Japan, but Japan is going to be an unstable country in 1990. You say, "How the hell do you get Japan unstable in 1990? They're number two in the world." Yeah, they are today. Look at the indicators. Ninety-six percent of their energy was imported in 1980, and 98 percent will be imported by the year 2000. Scarce resources -- iron, titanium, copper, bauxite, chromium -- 87 percent of all Japan's resources come from Australia. The seventh largest trade in the world is Australia to Japan. Now Australia's saying, "I think I'll do the value-added in my own country and do it here." Problems for Japan. Twenty-seven percent of all Japan's food comes from outside their country. From the U.S. they get 40 percent of their meat and their citrus. They're going from one cent on a dollar for self-defense forces to four cents. That's a major change.

But the worst problem is that between 1985 and 1990, 20 percent of the Japanese work force retires at 80 percent of their base pay for the rest of their lives. That's a productivity problem. That's why they went robotic as I mentioned earlier. Japan has some major problems. You don't have to worry about them bombing Pear Harbor -- they bought it, they own it, they're not going to bomb it. But you've got to wonder what they're going to do.

Now they always work in five-year cycles, and they work together through IAG, meaning Industria, Academia, and Government. This five years is going to be robotic to make up for the lack of people who are retiring. That's fine. What are they going to do in the 1990's? You know what they were going to do. Artificial Intelligence, fifth generation computers, bubble technology, protein chips instead of silicon chips, and talking computers. That's their next follow on.

Thank God we had some people who were bright enough last year to set up MCC. This is a consortium of the 25 biggest electronic firms in the U.S. with the exception of IBM, set up in Austin, Texas to work on the five major areas: artificial intelligence, bubble technology, protein computers, fifth-generation computers and voice-actuated computers. And that was done without antitrust legislation. I'm surprised with unions everybody else didn't jump on them, but they didn't even know what was going on until it was all over. The truth is that's our mainstay and the one regulation MCC has is its product does not leave the country -- it stays here, it belongs to our manufacturing capability. It's the only way to make it in the service economy.

And let me tell you -- we're going to a service economy, we're moving from four percent in agriculture to three percent by the year 2000; from 26 percent in manufacturing in 1980 to 8-11 percent by the year 2000. Eighty-eight percent of our people are going to be in the service economy. Every time you get one of those service jobs I mentioned before -- CAT scan reader, PET scan reader, NMR reader, emergency medical technician, geriatric social worker -- every time you get one of those workers, not even counting the engineers and scientists, you get seven other workers. You get the person who empties the bedpan, the person who does the cooking, the person who cleans up, the receptionist who brings people in; these are seven service-sector jobs coming from one little minor, not even a college-trained individual. There is one year of training for the jobs I'm talking about.

What I'm saying in essence is we've got a lot to look forward to and we're going to go robotic, let me tell you. Ohio should be the robot capital of the world, and you're blowing it. Your governor's giving lip service. The truth is you have Carnegie Mellon right next door in Pittsburgh where Unimation is, you've got Cincinnati Millicron, the second largest manufacturer; you've got the third largest manufacturer, General Motors, right up the block in Michigan; you'll be using the information here; it's the way we're going. We have to go robotic.

When I spoke to the AFL-CIO they said, "What do you mean we have to go robotic? We're better off keeping six workers." By the way, a robot replaces six workers if you use it around the clock. I've seen it working in Japan. You drive up to a great big plant producing a lot of stuff. And I said, "Where's the parking lot?" And someone says, "We don't need one, no one works here." The robots even had to join a union. But when you're using robots around the clock you can replace six workers, so the unions say, "Why should we pay for unemployment insurance, why should we pay for welfare, why should we pay for retraining? We'll keep our six workers." Right? Wrong! It doesn't work that way.

When you use robots it's not because of workers. It's because of things called "quality" and "productivity". When you use a robot you don't get 15 percent scrap, you get less than one percent scrap. When you use a robot you only need 60 percent of the paint when you're spraying; 40 percent is being saved. When you're using a robot with laser dimension mentality, you're dealing with thousandths of an inch, not a 64th or a 32nd of an inch. When you're using a robot, the car that's being made is nine times better in mean-time-between-failure rate than a Wednesday car. (Wednesday being the best. Monday the workers are hung over from the weekend, and it looks like it when they manufacture something; and Friday they put five of six bolts on because they're taking off for the weekend. The Wednesday car is our best car. The car built by robot is nine times better.) Now I know one of the guys in the union yells, "Yes but when they do the welding they use one-third more electrodes than we do." They do, because the robot welds everything. When

the people did it, only two-thirds of the welds got welded. That's why our cars fell apart. The robot does what it's told to do and it does it right.

Now this doesn't bode well for unions, obviously. They've got some major problems. You don't need strength or brawn or skill. You don't need a lot of people working in a machine shop, you don't need welders and you sure don't need paint sprayers. I took a look at the vocational system here in Ohio. What are you training? Paint sprayers, machinists, and welders. I said "My God, what about robot training?" "We don't have it yet. Some of the companies are doing it, but we don't train them in schools." By the time you get into it, everybody else is doing it already. The problems involved are major, they're not minor.

Before I come back to the education and training aspect, I want to talk about the other part of your problem. It's called the office of the future. Let me tell you something about cable. By 1987, 50 percent of the homes in the U.S. are going to have cable in them. Since 1973, every cable installed is really two cables: one going in and one coming back out. It's called interactive cable. You can shop at home, there is electronic delivery of mail, you can educate the kids at home, you can take care of medical diagnostics at home, you have special programs such as geriatric programs for older people -- you name it. It also means you can work at home. With 88 percent of the people working in the service sector, half of those are in information. The educational areas, the doctors, the lawyers; the whole business of collecting information, storing information, analyzing information, retrieving information. With 44 percent of your population working in the information area, half of those people could work at home. That's a major shift.

You know what happens when a husband and wife both work at home now with a computer? The divorce rate quadruples. It's called too much of a good thing. You have to have space, you have to have a way to get away from a person once in a while. And if you do work at home, you've got to have common hours. Tuesdays and Thursdays you've got to go to the office from

10:00 to 2:00 to share ideas, to hoist a few drinks, to shake their hands, to pat each other on the back or the rump, or whatever you do. You've got to do it, you have to share with people. The same is true in education. Grades K-3 can go to school on Mondays, Wednesdays and Fridays. On Tuesdays and Thursdays they stay at home and work at a computer using interactive cable with a teacher. And on Mondays, Wednesdays and Fridays the kids in grades 4-6 stay home -- they go to school on Tuesdays and Thursdays to press the flesh. High tech, high touch, whatever you want to call the thing. This is where we're going in the long term. And it means we've got problems.

When you have computers you can talk to computers. The National Security Agency has machines they use for telephone calls going overseas. They tape them all and put stuff out in different languages. In 1981 we had a breakthrough with the scrambler system. Now we have 18 major types of computers in the U.S. you can talk into; they can read 6000 words. You can read those words in context, and then the machine will type up 92 percent of what you said to it. And you go back and correct the words you slurred over or coughed during and it then has 97 percent of what you said. It corrects your spelling, it tells you if you have a noun and a verb, and it circles words that don't make any sense. It may be a word, but maybe not one of your 6000. Maybe it's mispronounced or something. But that's the way it does the job.

Further, when you talk to these computers, you can push a button and they will convert your input to one of nine different languages for you. They will type Hebrew backwards and Conji symbols sideways for Chinese and Japanese. You take it out of the typewriter and turn it vertically to read down the columns. It will not type idiomatic expressions. It types on a one-word-to-one-word correspondence. If you say "the spirit is willing but the flesh is weak", it comes out "the wine is fine but the meat is rancid."

By 1990 half of our middle-sized firms and most of our large firms will be using such computers. One-third of our secretaries and typists will lose their jobs in nine-to-five operations. Where do they go? They go into

the factory to control the robots. You don't need strength or brawn or skill to do that, you need word processing skills. When I first said this to one of the very large automobile firms (I won't give the name, I'll give the initials -- GM) the guy said, "That's marvelous. If 20 percent of the factory force are women, I can lower the salary 20 percent." An elevator problem: his doesn't go to the top.

A lot of older people don't understand. They grew up with the attitude that a woman's job is secondary, that a woman is supposed to stay home and bask in her husband's reflected glory. That may have been true 25 to 30 years ago, but it isn't true any more. A lot of the older people give equal opportunity and equal pay lip service, but they don't think it. They can't understand.

Let's not kid ourselves. We're going to a 32-hour work week by 1990. We're going to a 20-hour work week by the year 2000. In 1980 in 45 percent of married couples, both spouses were working. Sixty-five percent of the women were in the work force. Last year for the first time, in 50 percent of couples, both spouses were working. We're going to 65 percent by the year 1990 and 75 percent by the year 2000. Any time the husband walks in when both husband and wife are working and falls into his chair and says, "Honey when you're finished making dinner make up the bed, do the laundry and vacuum the floors", she's going to tell him where to put the vacuum cleaner.

It's changing, and our older people don't accept or understand, but the kids are growing up understanding this. If any young gal out there expects some guy to come chasing in on a white horse and carry her off to take care of her the rest of her life, she is one person away from being on welfare. Fifty percent of our females are getting divorced. They've got to be trained.

There are changes taking place out there like you wouldn't believe, and the education system is not compensating for them. We're not getting

women who are trained in technical jobs because we push them in the wrong direction. High technology is a great equalizer. There will be no job by the year 2000 that any woman can't handle. I'm sorry, there's one: probably a Catholic priest. Other than that, there is no job. A lot of our males see that as threatening. So you've got some problems and these things have got to be addressed. We're trying to push them away as if they don't exist. They exist. This is real. We're not going to have more hours being worked, we're going to have more jobs. There will be job shifting and job sharing.

Let's take a look at the robotic area. It's a classic example. What do you do when a robot replaces six workers? This was part of our study for General Motors and the National Science Foundation. You can't keep all six on board; you can't fire all six. You keep the four older workers. The average age, by the way, is 53 to 54 years old for the four older workers. You have them work a 20-hour work week and get paid for a 40-hour work week. And you've still got a 50 percent increase in productivity. And as these people phase out, your productivity increases even further. What about the two youngsters, who are about 38 by the way? You have them setting up robots, installing robots, repairing robots, selling robots, marketing robots, and exporting robots all over the world. It's a bigger industry by far than the automobile industry.

In the 1990's the automobile industry is dead. Take a look at automobiles. Thirty-seven percent of the automobile today is plastic by weight instead of metal. It's going to 50 percent by the year 1987. That means the steel industry is even worse off than the automobile industry, but we'll get back to that later. It also means that by 1991, 92 percent of the car by weight will be plastic, fiberglass with boron or carbon strengtheners. Thirty-seven percent of the Chrysler Fiera is plastic right now. Forty percent of the Honda convertible which is coming in from overseas is plastic. We're talking about a 1984 car that's lasting for the first time seven years and ten months. That's average. The longest we ever had was right after WWII when you had to pay under the table to get a car because there were no

cars available. Then they lasted for seven years and six months.

I remember when I graduated from college in 1952 the automobile industry's primary rule was that if a car is built to last for 40 months it should self-destruct at the end of 40 months. It's called built-in obsolesence. The paint should peel off, the engine should drop out and the transmission should be lying all over the road. That was the concept -- you didn't want it to last more than 40 months, or it took away jobs. So one year car makers changed the engine, the next year the metal on the outside -- bigger fins, smaller fins, side fins. And the third year they changed the interior. Then you had to buy a new car because your neighbor had a new-looking car. You didn't have a new-looking car any more. This was changed by the Europeans' working on cars. The car we're talking about in 1990 -- that's only six years away -- is going to last for ten years and two months, and the car by the year 2000, 20 years. The same car. You say "Gee whiz, it can't be." It can be. The Volvo lasts for 16 years today. The average one. You buy it today it will be operational in the year 2000. That's the competition. So we're talking about an industry that's dead.

The steel industry is in even bigger trouble, and we did it to ourselves. Every single country during WWII lost their steel plants except the U.S. Those who were bombed out built new plants, not the old besemer and open hearth. They built rolling plants, they built what we call now direct conversion, direct reduction. We use natural gas in steel directly. It's a lot cheaper than regular steel. The only country with the old stuff was Poland, who re-built the plants like the old ones that we're still using. That was stupid, but that's why Poland was in trouble. They're a marginal producer. Everybody else built brand new plants. What I'm trying to tell you is we can't compete. The unions asked for more and more. And we said "Sure, take whatever you want." We gave them pay increases; they were getting paid high, and we were still making a lot of profit. Then things got tough and we couldn't compete, so we said, "Look, you guys have got to come down in the unions, and we're going to build new plants." "No way, man, we worked too

hard for our salaries." They wouldn't compete, they didn't want profit sharing, so they fought management.

We're not going to have steel industry anymore. That's what it boils down to. The 12th industry is steel. Bionics, biomedical engineering, genetic engineering, enzyme research: that's one major area. The second one is robotics, computer-aided design, computer-aided manufacturing, computerized graphics, flex manufacturing cells. The third one is in telecommunications, fifth-generation computers, artificial intelligence. These are big high technology areas. You've got one of them near here. You've got the area of robotics, and you're not taking advantage of it.

You need four things for an area to grow, whether it's a state or a region. You must have a high technology university nearby. There's the Route 128 complex with Harvard and MIT up there. There's Duke down there in the research triangle. The University of Utah is there for the work of Bionic Valley, and Stanford is near Silicon Valley. And you've got the universities here. You've got Carnegie-Mellon, you've got Ohio State, you've got Michigan State and Michigan. This is a regional area. Why do you need a university? Because you can hire the professors as consultants and you're not stuck with them forever; and you've got your slave labor, called graduate assistants. You can use these people; and you haven't.

The second thing you need is a good vocational setup. You can use the people there, the mechanics, the electronics technicians, people to be trained as robotics technicians and computer-aided design technicians. You haven't got it in this system over here. The governor's paying lip service to it, but not doing it. Your educational system, that's number three. You're not keeping up with the salaries that ought to be paid. You need a good educational system so your kids will stay here and raise their families. If the educational system is not good, they'll leave. And you can't attract new kids in, because they have families to raise, too.

Further, and one I'm not sure you can control, but it's something you better take a look at, is a right-to-work state. Where you can be union or non-union. If yours isn't, you won't get the corporations to come here. I'm not saying it's good or bad, I'm telling you what is. If you don't like the message, please don't kill the messenger. You have to give the people choices. You know what's happening with unions: they have no clout anymore. A little more than 22 percent of the work force in 1980 was unionized. It's going to 17 percent by the year 1990 and 11 percent by the year 2000. The Hispanic community and the Black community will have more political clout than the unions do. With the new regulations coming out saying go bankrupt or move someplace else, you know what's happening. It's called "sundown industry". They're going to the Sun Belt and when they start getting water down there -- to places like New Mexico, Arizona, Colorado, Northern Texas, Southern Utah and New Mexico -- you're not going to be able to compete.

You've got in this area three of the four ingredients that you need for growth. The work ethic is great up here. But you're losing something in the translation; I don't know what it is. And I'm saying this not only about this state, it also has to do with Pennsylvania, Michigan, Illinois, Wisconsin and Minnesota. In the old days, this was our heart, our industrial heartland. We're letting it die. People don't seem to give a damn anymore, and it's a shame.

The educational level is one thing you can do something about, and so's vocational education. You've got to start someplace. The CETA program was supposed to do this. Remember the Comprehensive Education & Training Act? That was a bigger bomb than the military ever built. Billions of dollars were wasted. Sixty percent of the money was used for administrators, only 40 percent was used for training and between three and 15 percent of the people got jobs. It was closer to three in most states, by the way. You trained people for jobs that didn't exist. Until 1979, we trained people to be manual elevator operators. The last manual elevator was built by Otis in 1961. That was crazy. Until 1978 you trained people to be linotype operators. There were

11,000 people in this country standing behind an optical character reader while you trained linotype operators. The last linotype was built in 1963 in Brooklyn.

Do you know the biggest CETA program in 1976? It was our 200th birthday, so they painted fire hydrants red, white and blue. This was stupid. So what I'm asking you is who's running this program, what are they doing? It was run by political hacks and union leaders. Their attitude was "We're not going to train people for jobs that exist. We're going to train them for jobs that don't exist because they won't take jobs away from people who are working." Are we crazy? We did it; we trained people for jobs that didn't exist.

So the new administration asked me to work on a new Job Training Partnership Act. I thought that would come from Democrats but it came from Republicans. (By the way, the education aspect also came from Republicans. I thought President Reagan was going to kill education but he didn't. He probably did more good than anybody else, in spite of himself.) I said I'd be glad to work with the Job Training Partnership Act. But the first requirement was that 70 percent of the money had to go for training. They agreed. No more than 15 percent must go for administration; and 15 percent was to go to the illiterate, to educate them to where they could be trained later on. We also stipulated that the money wasn't to go to a bunch of politicians and union leaders, but rather to private corporations. That's what we put out in law. What happened? I really had underestimated the creativity of the political hacks and the unionists. They got together and made themselves a corporation, they took the money and they're wasting it the same way they did before. Six states are the worst abusers: Pennsylvania, Ohio, Michigan, Illinois, Wisconsin and Minnesota. And the Governor doesn't do a damn thing about it except sit there and say, "You ought to be ashamed of yourself." But he gives them the money anyhow.

I talked before about the problems we have with paying teachers. Let me talk about education a moment in the context I just mentioned. You're going to have to get better teachers. You're going to have to set standards. The minimum SAT score to go to college and become a teacher should be 850. Minimum. And if you haven't got a 3.2 average by the end of your sophomore year, you don't go to a professional school for teaching. Become a doctor or a lawyer or an engineer, but not a teacher. It's too important to let you play with it and louse it up.

In addition, you'd better become computer literate. Because computer literacy is going to be like driving a car. I'm not saying you have to know Fortran, Cobol and BASIC languages -- I don't care about that. I want you to take two courses and know what's going on -- when you drive a car, you know where the key goes, where the water goes, where the oil goes, where the gasoline goes. And you know if all of a sudden your horn keeps blowing you don't open the gas tank to stop it. The same thing is true with a computer. You have to know how to use it, and what it will do for you. You don't have to be able to take apart an engine to drive a car, but you should know what an engine does. The same thing is true for a computer.

Computer literacy is here. Carnegie-Mellon and Drexel and of course Clarkson said last year you can't start college without a computer. Twenty-five percent of all the engineering schools are saying "You must have a computer to start." And next year, 25 percent of all colleges will be saying the same thing. When I was in a school not too far from here, I saw kids up to my knee punching around a computer. I asked what they were doing, and someone says, "Oh those are the graduate assistants' kids and the professors' kids at the Day Care Center and Nursery School." I said "How old are they?", and he said, "They're two and three years old." I said "How come they're playing with computers?" He said, "Oh, they're too young to have the coordination to write yet." I said "What?" And he said "They can't write so we gave them computers." I said, "How old do they have to be to get into school?" He said, "It's not a question of age. They must be able to walk and they have

to be toilet trained." That's how they get into school. And by the way they have Saran Wrap over the keyboard. He said, "Their mothers give them peanut butter and jelly sandwiches and they get it caught up in the keys." This is real.

My wife is a teacher. She's been teaching kindergarten for 26 years. I've been telling her for five years she ought to become computer literate. Any teacher who doesn't become computer literate over a period of four years should have her tenure taken away. That's pretty stiff stuff, but I don't think they should be out there teaching unless they understand. It ought to be under your belt when you graduate today, but if you finished a few years ago, you'd better go back and catch up. My wife last year said, 'I'm going back to school to learn how to use a computer." So I asked her, "Why are you taking computer courses now?" She said, "This morning, I say to my kids (and they're 4½ years old, in kindergarten) "Can you spell 'in', can you spell 'on', can you spell 'mom', can you spell 'dad', can you spell 'run'?" And one of these kids says "I can spell run: r-u-n-carriage return." That's the reason she went back: "The kids know more than I do. I can't be intimidated by a 4½ year old."

Computers don't replace teachers, you know. You need them for six to ten minutes an hour, that's all. With a computer you go at your own speed, you go privately; it gives you immediate feedback, positive or negative. But it won't teach you the Socratic method, it won't explain problem-solving techniques, it won't explain rationales. It can't give that interchange back and forth that a teacher gives with the reasoning behind it. But after you learn that reasoning back and forth and the problem solving, you can go to work at your own speed. When you do something right, it says "Gee, that's marvelous. That's exactly right. Let's go on to the next part." If you get nine things right, it tells you nine times that you're right; for the two things you did wrong, it says "These two, let's try again; here's a little modification." The teacher comes back later, she retrieves the information and says, "Oh, this child did these nine well. Let's put a little time into

these two areas only." She's homing in the problem, and that's important.

Now I want to say a couple of things about education. All teachers need an increase of 20 percent across the board. Math, physics, chemistry, vocational education -- an increase of 40 percent across the board. I know you're going to say, "I'm an English teacher, and that's important." But we live in a capitalistic society and it's called supply and demand. Of 359 people graduating in mathematics in California, nine go into teaching; 350 get an increase of 50 percent over teaching salaries and go to work for private firms. Texas ought to have the answer: In math, physics and chemistry we'll pay for four years of college and when the students finish they'll work for us four years. Right? Out of 156 such students, 153 went to work for private firms and the companies paid back the State for their education expenses. You've got to pay people what it's worth.

I'm not saying salary is the most important thing, because it's not. But there is a level below which you can't go, and many times teaching salaries are below that. We still consider it a female occupation even though it's not, and we pay for it as if it were a female occupation. So you've got to set standards and then, after you get equity or parity in pay, then you go to a merit pay system. Not merit in place of equity. We must go to merit pay in the long run anyhow. The only people who don't give merit pay are the socialist and communist countries. But first you have to get some sort of parity or equity. If you don't, you're wasting your time. You don't put one in place of the other.

The question is always raised, "If you're asking us to pay our teachers an average of 30 percent more, where are we getting the money for computers?" The money for computers comes from the Job Training Partnership Act, which says that I can get computers only if I'm going to use them for unemployed people for eight hours a day. So I get the computers from the Job Training Partnership Act, and I place them in the schools. I use them from 4 o'clock in the afternoon to midnight for the unemployed.

So from 8 a.m. until 4 p.m. I can use them to educate and train kids. Next I go to the local manufacturers and industrialists and say "Look, you can use the computers for your midnight until 8 in the morning shift. All you have to do is pay a few bucks for a teacher and $60 a month for the maintenance charge."

Computers don't wear out because people use them around the clock. Computers wear out because you turn them on and off. It's the surge of current. It's like the world's oldest profession: You've got the product, you can sell the product, and you've still got the product. It's the same with computers. They're there around the clock, we just don't think in terms of having that product available for something else. It's important to understand that these kids need that capability. What I've been saying is we've got to look long-range and look without blinders. We're just not doing it.

FRED BUCK

The first thing I would like to do is raise a little bit of caution with regard to forecasters. I have found that something significantly less than 100 percent of what they forecast comes true, and I'm sure you have similar experience. I would like to show you specifically how that relates to health care.

Figure 1* is derived from a report called "The Non-Agricultural Wage and Salary Employment Survey" done by the Center for Human Resources Research at Ohio State University. The point I would like to share with you here is that this is where the state of Ohio projects the biggest growth by major employment groups, 1980-1990. Health care is in the service area. Service and manufacturing are projected to have large increases.

Figure 2 shows job openings projected for 1980-1990 by major occupational groups. So in Figure 1 we saw growth by industry, whereas this shows more specifically what kinds of jobs will be available.

If you know what EEO or Affirmative Action Plans are, these categories are derived from EEO. There are eight major EEO categories, starting with officials and managers and going all the way down to service, and that's where these groups are from. You can see that the greatest number of openings are going to be in clerical, service, and professional/technical. The need for managers is high, too, according to the projections. So again, this is where

*Figures referred to appear at the end of Mr. Buck's speech text.

the "experts" say we're going to be having job openings in the state of Ohio in this time period. Remember, we're already one-third of the way through the period of 1980-1990.

In Figure 3 let's take a look at health care -- what's important here is the percent change that's prognosticated to occur from 1980-1990. A growth of 38 percent is projected for health services in general, 13 percent in physicians' offices, 27 percent in dentists' offices, 37 percent in hospitals and a 79 percent increase in outpatient care facilities. That's what the general types of growth are projected to be in the health care, dental or medically related area. One comment that I would make about the actual numbers is that the health care figures are very small compared to manufacturing and to other categories. There will be a high percentage of growth, but it will occur on a very small base.

Figure 4 shows the projected number of jobs which will be available both by occupational groups and for selected occupations. In the state of Ohio a growth of 675,000 is prognosticated. But you can also look at the kinds of actual jobs here, including medical workers, professional nurses, technologists, LPN's, engineers, and so forth. You can see growth in openings for nurses, teachers (which you're all interested in), health technologists and technicians, and so forth. Obviously as a state and as a country, we are growing.

There are some considerations that relate to the health sector not only on a regional or local level, but also nationally. The world has changed very dramatically over the last two years. Up until January 1, 1984, not even three months ago, the world of health care received payment for services rendered on what we called a cost-plus reimbursement basis. The more you spent, the more you got reimbursed. There really wasn't any incentive to do things efficiently or at a lower cost. But as of January 1, 1984 there is a certain fee for a certain type of surgical procedure and a certain factor for length of stay; by manipulating these things you come up with the cost of this

particular service, and that's what the health care provider will be reimbursed. It's not too different from the way industry has always done business, but in health care we've never done it that way. We have employers here today; one of the things employers are interested in today is reducing their health care costs. A couple of people on this panel have that as a stated organizational objective. Employers want to reduce the amount they are paying for health care by causing people to reconsider care, to manage themselves better, or to choose outpatient rather than inpatient services.

Another major influence on health care is competition -- health care provider is competing against health care provider today, which was never the case before. From a business viewpoint people think that's good. But health care has never been a profit and loss business; it's been a care business, and the changes will take some time. One thing that's happening as far as jobs is that we're seeing more of a need for generalists as opposed to specialists. The growth of health care will not be as large as the statistics indicate. It's not going to be zero, but it's going to be significantly less than is believed. How much? I don't know; frankly, at this point your guess is as good as mine. We're really in a state of change. We in health care are in a turbulent environment. I don't think there's anybody who can tell you what it's going to be like next year, the year after, or the year after that.

And the last thing affecting health care is technology. Technology is very important, and is having a tremendous impact on health care. Technology probably is one of the ways that we're going to be able to reduce the cost of health care without reducing the quality. You've heard about NMR's; shock waves are being used to dissolve kidney stones; and so on. There have been so many technological advances. It's space age stuff, and it's being used to provide health care.

The best advice I can give right now is not to discourage people from seeking traditional careers. I wouldn't believe for a minute that there will not be a need for a lot more physicians in this country. Look what's happened

with attorneys. There are significantly more attorneys now than there were five and ten years ago, and they're all employed. What they've done is create new areas of service. I think the same thing will happen to physicians. Doctors have probably the most prestigious job -- and one of the better paying ones -- in our society today. It's not without sacrifice; it requires a lot of hard work.

An earlier speaker commented that after the year 2000 a quarter million people will be older than 100. That will have a lot of implications for health care: A certain kind of health care will be required. And what about all the people that are going to be between 75 and 100? Our population is growing older, so certainly that's going to be an important and growing area of health care.

Cancer: We're getting closer and closer. Probably in our lifetime, maybe even sooner, there will be a cure for cancer. It happened with polio, it happened with many other diseases and it's not beyond reason to believe that it will happen with cancer. So health care is always going to be there, but it's going to take a different form.

What do we in the health care field look for in people? Obviously we look for a good basis in science and math, and we also look for good "people" skills. Lots of times people that are highly technical are very good from a science and a math standpoint, but not so good from a people standpoint. That causes lots of problems. Obviously we're in the people-care business; we're in a team business. There's no one person who treats a patient; it's a team. Everything we do is by team. So the interpersonal skills in health care are extremely important.

To sum up, one thing I would say is that you can't believe all you read and hear and the other thing is that the future is not without hope. There's a lot of potential there. It's going to be different. We're going to need more frequent adjustments and updates -- in other words, flexibility. No one can tell you it's going to be the same way for five years. It's going to be different.

CAREER OPPORTUNITIES FOR THE FUTURE

Fred P. Buck

Presented at The Cleveland Museum of Art
March 29, 1984

*Information taken from Center for Human Resource Research by Ohio State University, Columbus, Ohio, 43210

Figure 1

EMPLOYMENT GROWTH 1980-1990 BY MAJOR INDUSTRY GROUPS

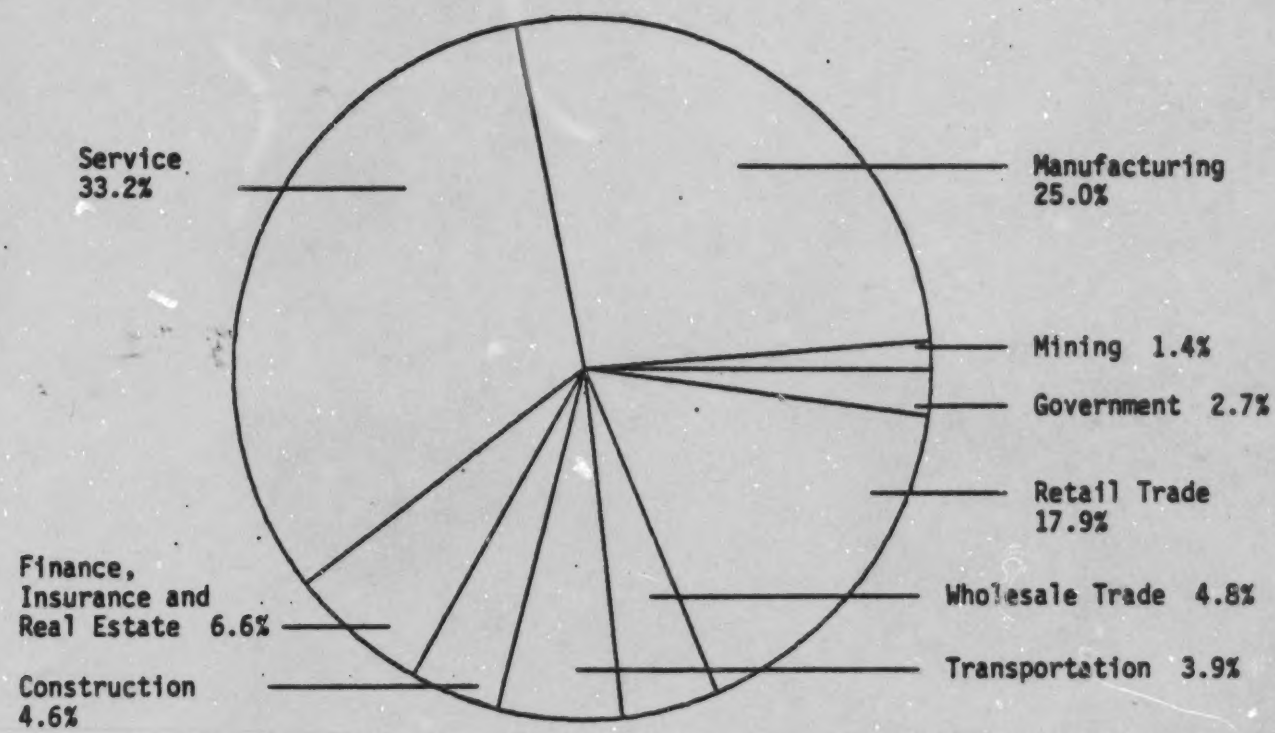
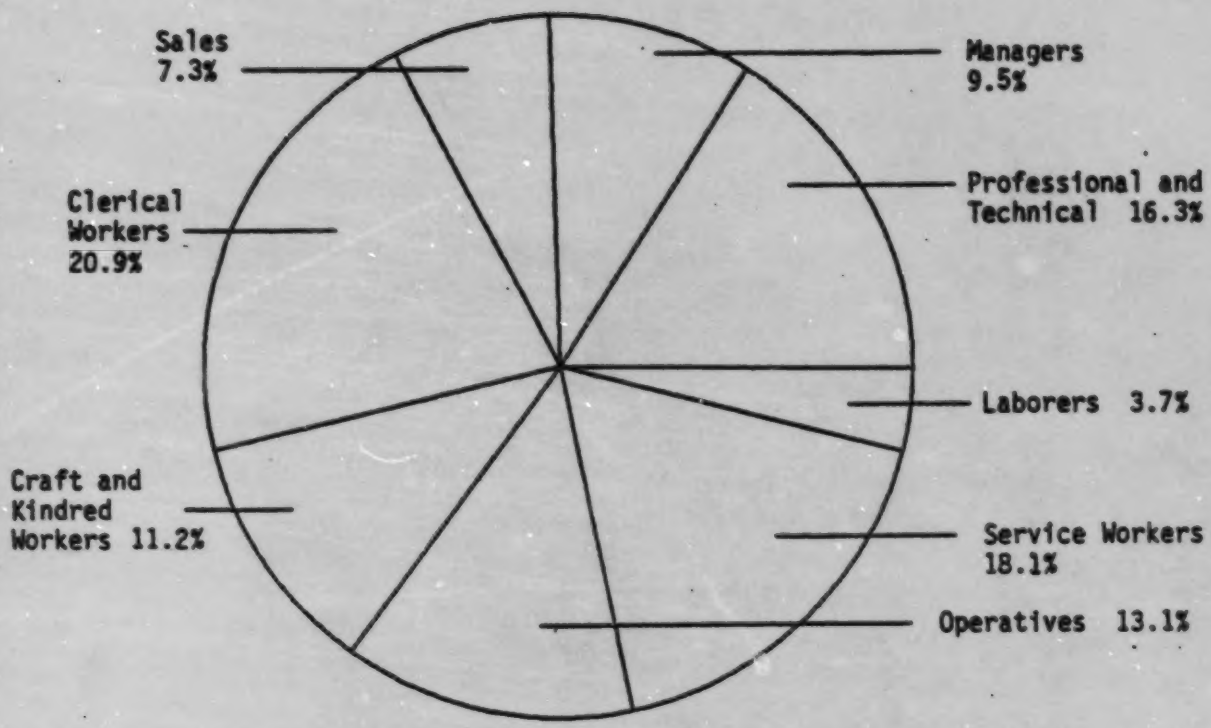


Figure 2

JOB OPENINGS 1980-1990 BY MAJOR OCCUPATIONAL GROUPS



OHIO
ESTIMATED AND PROJECTED NONAGRICULTURAL WAGE AND SALARY EMPLOYMENT BY INDUSTRY
ANNUAL AVERAGE: 1980 - 1990

SIC	Industry Title	Estimated 1980 Employment	Projected 1990 Employment	Employment Change 1980-1990 Net Change	Percent Change	Annual Average Change
75	Automobile repair, services, garages	31,000	40,700	+9,700	+31.3	+970
751	Automobile rentals, leasing, w/o drivers	6,100	7,800	+1,700	+27.9	+170
753	Automobile repair shops	18,200	23,700	+5,500	+30.2	+550
754	Automobile services, except repair	4,900	6,900	+2,000	+40.8	+200
76	Miscellaneous repair services	19,000	22,900	+3,900	+20.5	+390
769	Misc. repair shops & related services	11,600	14,200	+2,600	+22.4	+260
78	Motion pictures	8,000	8,100	+100	+1.3	+10
79	Amusement & recreation, exc. motion pictures	37,100	44,200	+7,100	+19.1	+710
793	Bowling alleys & billiard & pool establishments	9,900	10,900	+1,000	+10.1	+100
794	Commercial sports	5,000	6,400	+1,400	+28.0	+140
799	Misc. amusement & recreation services	18,100	22,000	+3,900	+21.5	+390
80	Health services	320,900	443,300	+122,400	+38.1	+12,240
801	Offices of physicians	32,700	37,000	+4,300	+13.1	+430
802	Offices of dentists	16,000	20,400	+4,400	+27.5	+440
803	Offices of osteopathic physicians	2,500	4,100	+1,600	+64.0	+160
804	Offices of other health practitioners	4,900	7,200	+2,300	+46.9	+230
805	Nursing & personal care facilities	53,200	82,500	+29,300	+55.1	+2,930
806	Hospitals	197,700	271,300	+73,600	+37.2	+7,360
808	Outpatient care facilities	6,700	12,000	+5,300	+79.1	+530
81	Legal services	22,500	27,500	+5,000	+22.2	+500
82	Educational services	388,100	388,100	+0	+0	+0
83	Social services	46,100	67,100	+21,000	+45.6	+2,100
832	Individual & family social services	11,500	15,300	+3,800	+33.0	+380
833	Job training & vocational rehab. services	4,500	6,000	+1,500	+33.3	+150

FIGURE 4

Projected Change in Employment and Projected
Total Job Openings Due to Growth and Separations

Major Occupational Groups and Selected Occupations
1980 - 1990

	Change in Employment	Total Job Openings
All Occupations	674,950	2,158,470
Professional and Technical	110,330	351,570
Medical workers, except technicians	29,910	66,730
Professional nurses	21,140	47,700
Teachers	1,870	65,080
Other health technologists and technicians	24,020	53,990
Licensed practical nurses	11,930	27,260
Engineering science technicians	8,160	18,000
Engineers	7,570	20,520
Accountants	5,670	17,460
Writers, artists, entertainers	3,350	13,410
Social workers	4,010	11,470
Lawyers	1,830	8,390
Computer specialists	4,810	7,690
Managers	53,390	204,220
Store managers	4,490	18,730
Restaurant managers	3,210	10,460
Sales managers	1,600	4,730
Public administrators	460	4,540
Wholesale managers	1,130	4,670
Sales Workers	41,320	157,680
Sales clerks	17,930	71,460
Insurance agents, brokers	1,700	5,870
Real estate agents, brokers	880	3,690
Sales agents, stocks and bonds	500	1,320
Clerical Workers	127,760	451,310
Stenos, secretaries, typists	24,940	95,620
General office clerks	15,670	55,470
Bookkeepers	11,670	45,010
Cashiers	8,520	36,180

NORMAN BLISS

Good morning. You know I'm still overwhelmed by Dr. Cetron's presentation. I ought to run out and grab his books and start reading, because it's kind of scary dealing with unpredictable change. Part of the presentation I would like to make this morning is how we've dealt with it over the past 15 years and survived. Particularly if you're over 40, change is tough to deal with and I'd like to tell you a little bit of how we've dealt with change over the years and how we're planning to deal with it in the future.

I have always been an entrepreneur, and Polytech was one of my first ventures. Polytech is a consulting professional services firm; we do architecture, we do engineering, we do planning, we do demographics, we have scientists, and we have economists. There are about 60,000 firms of some substance who do this kind of business in the country, but in our industry's top 500, we're number 220 on that list. So we're not a small firm. And we're certainly not a minority firm; we just happen to be owned by Black folks, which I think is significant, but I don't want to be put into the context of being a minority firm.

But how have we struggled and survived with change? Over the years we've spun off five different companies, and hopefully in the future we'll do some more. But the five spin-off companies have been in land development, and in property management and ownership; we have a research

and environmental laboratory; we have an administrative services firm, and an investments firm that's looking for overseas opportunities. Opportunity is here if you look for it, and if you take advantage of it when it comes knocking at your door. And over the years at Polytech we've tried to do just that. We weren't always number 220. We were three guys in a basement wondering why we had quit our jobs and wondering if the great American dream could, in fact, pay off. But we had an idea and we had enough venture and equity capital and enough drive and determination to take advantage of the opportunity.

I think part of what we have to get across to our young people today is that success is possible if you work hard. The world doesn't owe you a thing; but you can do it if you work hard because success is 99 percent work, not luck. So part of the message I think we have to get across, as educators, is that it can be done if you have your goal in mind, you can see clearly that this is what you want to do, and you prepare for it.

As I said, I've always been entrepreneurial. Gil Brooks mentioned as he introduced me some of the projects that we've done locally, including the Lakeview dam, and I can't recall since the Egyptian times any Black folks building a dam. But it's right out here in Lakeview Cemetery and it's a monumental structure that we're very proud of. There's a great deal of liability in designing such a project, because if something goes wrong, you've got 20,000 people dead downstream. So it's a very responsible project. Another very visible project is the 45-story Sohio headquarters building now under construction on Public Square. I take pride in these projects.

But there's also pride in something that happened just a month ago when the Superintendent of East Cleveland Schools, Dr. Edwards, and a few of their guidance counselors had enough interest in their young people to call me and say, "We have a group of 25 high achievers; they

want to be architects, engineers and scientists. Can you and your staff spend a day with them?" And we responded, "Certainly we can". We took a bus ride around Cleveland and looked at about 50 projects, some of which we designed and some of which we constructed, and then we went to my office and we spent the balance of the day talking with engineers, architects, scientists, and so on, to see what could be done to give these youngsters some early exposure to what might be a future career field for them. That is the partnership that I want to talk about a little later that we have to work out between educators and industry. It won't work otherwise, because we're getting kids out of high school who don't even have the first idea of what the work ethic is, they don't have the foggiest idea of how to put together a resume -- that is, if they can write -- so I'm saying that early on we've got to get our youngsters into a planning mode so they can see what their career field might be and they can have role models and identify with them. I'm talking not just about minorities, although I happen to be very concerned about minorities; but I'm talking about everybody. And the partnership I'm talking about is not just Polytech, but it's all industry; all majority and minority firms have to work with the school systems. I'll get back to that a little later.

We now have Polytech offices in ten American cities and we also have two international offices. I sent two people yesterday to Alexandria, Egypt. We've got people working in Djibouti and we've got people working in Botswana (don't ask me where that is). We've had quite a bit of worldwide, as well as domestic, exposure. And I say why not? I think it's my turn. I think it's my turn if I have the fortitude, the foresight, the quality of product, the people and the dynamic vitality as an operating entrepreneurial firm to participate.

What I do with my profits is my own business, and that's part of the fun of being an entrepreneur. And if I want to plow a significant portion of those profits back into young people, I think that's good. I think it's fair and honest and I think it should be done. When you make a profit in an entrepreneurial enterprise, you do what you damn well

please with it. And part of our commitment is giving some of this profit back. Why? Because it's socially right, and because it's good business. It's really good business to build something behind you.

What kind of people am I looking for to come into this kind of an enterprise? Obviously, I want people who think like I do. On new jobs, I want generalists. I don't want specialists; I want people who can be flexible, who can deal with change. I want people who are upwardly mobile, who are looking at the next rung on the ladder from their first day on the job. I want people who would rather grow than stay in the same job for 40 years. I want creative people. And in an engineering firm like mine, I want computer-literate people. Sometimes that's hard for us old-timers. When I went to Case Western Reserve many years ago I was overwhelmed in my freshman year because I was the only person who didn't know how to use a slide rule. Now the slide rule has gone to the Smithsonian; nobody uses one anymore. Now I know how to use a slide rule. It took me a long time to learn how to use a computer, but now computer literacy is a prerequisite for entry into engineering schools. As an educator or as a potential employee, master the use of that tool and it will enhance your job. So I'm looking for creative people who are generalists, who can change with the times.

I've got 15 associates in my firm and at some point in time I would expect each of those associates to be prepared to manage one of our outside entities -- to be an owner/operator and manager of a profit center of a complete subsidiary or free-wheeling entrepreneurial enterprise. In the next five years there will be tremendous opportunities for new company starts -- entrepreneurial starts -- in the high-tech fields. I'm not going to take your time to go over all of these but I will refer you to a supplement to last Sunday's New York Times. This is mandatory reading for guidance counselors, administrators and teachers. It covers what's happening in high technology in all fields, from fiber optics to computer-aided design. It tells what the requirements are, what the job projections are, what kind of high school and college education is required; it's like a Bible. Please read this and be sure it gets into the hands of the guidance counselors.

I'm not advocating the New York Times, but in the business section of same issue there happened to be an article on entrepreneurial development. This article discusses who is going to be an entrepreneur, how you do it, how you get started, what businesses should you be in, where you look for money, and where you'll most likely find success. And a very interesting part of this article says that 90 percent of the new jobs that are created between now and the year 2000 are going to come from new entrepreneurial starts -- not from smokestack or existing industries. So I think our guidance counselors and educators have to come to grips with that because we have to motivate our young people toward opportunities that are going to exist in the 1990s and the year 2000. We don't want any more tea tasters or shepherds. But I do direct your attention to these two articles if you have the chance to read them.

I'd like to conclude with a few recommendations. Maybe this is possible in your school system and maybe it's not, but it is something I've found to work. I talked about a partnership between industry and school systems. I really feel strongly about that. Something as mundane as letting a student come out to your shop and do a senior project is going to be a relevant experience for that student. Twenty years from now the young man that came down to my shop last year will remember installing a new Prime 1120 computer. He'll remember it because he worked like crazy. He laid out the draft; he laid out the room in terms of the drafting concept of where the computer would go; he dealt directly with the manufacturer in inventorying all the parts that came in; and he ran some elementary programs. He did more than just plug the computer into the wall, He had a hands-on three- to four-week working experience with computers that I'm sure will be with him the rest of his life. And I'm saying that we need to repeat that experience for every high school senior who is interested. You need enough industries, of course, to cooperate. Polytech is taking five students this year. I interviewed a couple of them yesterday and I enjoy doing that, there's something in that for me. But I think it's more important that something be in it for the young person. Every young person should have that kind of opportunity early on because success early in that youngster's life

is going to give him or her a foundation to build on for the future. So I'd like to see that as a part of the partnership.

We started a program with the Urban League here in Cleveland (and we repeated it in several other cities) called the Technical Outreach Program, where we reached out to inner-city schools to get students interested in science and engineering as future career fields. We didn't say they had to become a scientist or engineer, but we gave them some options. It's primarily a dialogue, big brother, big sister-type program which culminates in having science and engineering clubs in inner-city schools. Then you can get some competition going between schools; but more importantly, these kids have a chance to dialogue with some real-life role models, and ultimately, perhaps, we can change the fact that only one percent of all our scientists and engineers are Black. That's crazy. But I'm saying that these things won't happen unless you put some creative effort into designing programs between school systems and industry.

The other recommendation I'd like to make is that our guidance counselors stop spreading ignorance. Guidance counselors should participate with industry and work-study and participation programs so that when they go back into the schools they can speak from first-hand experience. I would advocate some kind of a program with each school system where guidance counselors could spend two to three weeks paid, not free, working in relevant industrial positions -- in personnel, engineering, operations, etc. -- to see what's going on, to gauge the mood of industry, so that when those counselors go back to the school system they have a valuable message for the young people. It really bothers me to see a system where a high school guidance counselor has 600 students to deal with in the course of the year and sees each one for half an hour. You're laying out students' career profiles that are going to have an impact on those kids for the next 25 to 30 years of their lives; and you, a guidance counselor, have never been exposed to the real world. Just imagine if that same guidance counselor could work one or two weeks in five different industries for a summer, and be paid for it; just imagine how much more valuable that person would be

to students in their curriculum choices, and in college choices, too.

The final thought I have for you is that a young person can live for seven days without food. He or she can live for three days without water. And that young person can live for three minutes without air. But the young person can only live for ten seconds without hope. Our job is to give that young person motivation, a foundation of education, and hope.

RANDOLPH G. COLEMAN

It is with a measure of humility that I stand befcre you today. There's little in my background that qualifies me to be prescient about the next 20 years. Academically, there was a score of professors at Ohio University who probably felt public funding of my education would never have survived a cost-benefit analysis. When asked by Gil Brooks to present to you my thoughts on the local employmant needs of service industries to the end of this century, I sought some counsel from several associates and friends, blended in some personal biases, and will attempt to present what I see as the challenges and changes of the next 20 years. The task before you is a formidable one. The education profession is under seige by a population that seems to give little, but expects a great deal. If we believe most of what we read and hear, the products of our education system come to adulthood substantially underprepared to deal with the increasing demands of a system that requires immediate results and short-term benefits and has a tendency to discourage quickly that which doesn't fit. Immanuel Kant perhaps best addressed your plight and the magnitude of your responsibilities when he said, "The greatest and most difficult problem to which man can devote himself is the problem of education."

While my comments about the future needs and the services business are directed to our local area, the industrial Midwest, certainly many of the issues are national in their scope and will have a significant bearing on the course of education in this country. The services industry is an

area of our economy which will continue to enjoy the greatest growth over the next 20 years. This national evolution from agriculture to manufacturing to service has occurred essentially within the last 90 years. The services of bankers, lawyers, accountants and other professionals are undergoing profound changes. This product has shifted to a great extent from giving service to giving advice. John Naisbitt in his book Megatrends* contends that the major product produced in this country by the turn of the century will not be cars or computers or communications satellites, but information. Let us look at the changes occurring in banking, a formerly labor-intensive service business, often priding itself on the personal touch. What we see now are branches closing, routine functions being performed by automatic teller machines, and a reduction of semi-skilled labor at the same time that there is an increase in service level for the customers. What about the workers in the banks' bookkeeping departments? After all, someone has to sort, file, and return the 38 billion checks written annually in this country. In 1983 400 million payments were made electronically, with no paper involved. That volume is growing at better than a 40 percent-a-year rate; check writing is growing, but at a rate now estimated at less than three percent. By 1989, check usage is expected to begin a decline as a method of payment. Even now a great deal of the labor-intensive work of check handling is done by machine. Those jobs left require higher skills and deal primarily with exceptions. Even the bank's traditional role as a lender is being refined. You don't get loans now, you get a line of credit. And even that judgment is often made, right or wrong, not by your sitting with a loan officer and convincing him or her of your credit worthiness, but by an automated analysis of your financial condition.

There will be major changes in banking in Ohio during the next 20 years. Deregulation of the banking industry has allowed untraditional players into the financial marketplace. Stockbrokers, credit unions, and savings and loans offer checking accounts. Bankers offer stock services.

*Naisbitt, John, Megatrends: Ten New Directions Transforming Our Lives. New York: Warner Books, Inc. 1982.

Retail stores such as Sears now engage in the business of financial services, like brokerage and insurance. Furthermore, bank consolidations, both intrastate and interstate, will occur and the number of individual banks will shrink drastically by 1995. But the availability of financial services will expand, with a major product being financial information.

While I have dwelt on banking more extensively, let me comment on the accounting and legal professions. What products do they sell? Accountants don't really do your books; they provide consulting services. They interpret tax laws. They provide information. Lawyers don't all practice in the courtroom; they negotiate mergers, they draw contracts, and they interpret government regulations. They provide information. When we discuss information we tend to think of computers, those vast warehouses of data. To use those devices, we must prepare people to be programmers, to be key entry operators. After all, someone has to feed and maintain the data bases. That may be true now, but it won't be true in 20 years. Computer programmers will become the blue collar labor of the next two decades. Data entry will rely less on keyboards and more on scanning devices. Loading and programming data won't be nearly as important as creating new ways to use the information that will be available. Within 20 years, nearly all of us will have a computer. Those computers will be linked to huge information bases. User-friendly instruction will make it simple to access the information. But what we must learn is how to use it. If we can accept the assumption that the service industry will continue to find ways to automate the labor-intensive areas of their profession and will strive to maximize the sale of their product -- information -- who will be the employees behind that industry? I submit that by the year 2000 close to half of that professional work group will be women. Why? In 1950, only 24 percent of all college graduates were women. In 1980, 48 percent were women. Not only that, the total number of female graduates is growing while the total number of male graduates is declining. Are these national trends significant for Ohio? I believe they are. Ohio is undergoing the same type of job dislocation experienced in the Northeast several decades ago. However, it has a broader economic base, and the transition will not be as difficult.

Ohio has the human resources to fill employment needs and the market in which to sell its products. Its geographic location puts it within 500 miles of 45 percent of the population of the U.S. Despite its slow population growth (1.3 percent between 1970 and 1980), Ohio remains a dominant state in the Midwest. And when the water runs out in the Southwest, Ohio will look a lot better to the people who left it.

What role should education take in preparing employers for this changing employment market? And what will be some of the issues educators might have to contend with? There will be a continuation of the trend to one-parent children and children of two working parents. The implication of this shift is to place even more burden on the education system in terms of social-skills instruction. Because of the growing economic interdependence of nations, schools should give more emphasis to providing insight into our changing relationships globally. National self-sufficiency will continue to decline and world markets will expand. When I examine the potential non-domestic market for information services I conclude that to be successful in selling our products, we should be more conversant with the culture and language of our customers. The largest potential markets are China, Russia, India, Spain and Portugal. That's an interesting challenge.

There is presently a great emphasis on computer literacy. I am concerned that more emphasis is being placed on making the device function than interpreting and understanding the information to which it has access. The proliferation of home computers will assist in removing the technological fear from children, so teaching how to use the device will become easier. Teaching its potential will be your opportunity. Visual input will continue to be the main technique for knowledge acquisition. Therefore, reading comprehension skills are absolutely vital. There is sufficient evidence in today's work force to alert us to the decline in that capability. To transmit information effectively, oral and written communication skills will be required. Competent communication is as important as the product.

Let me summarize. Ohio will have an expanding services market. There will be a trend in services to less-skilled specific jobs. Positions that will be important will be those where the employee brings literate, articulate, creative and analytic skills into play. Job satisfaction will come from the ability to manipulate information into productive new ideas, and will improve our social and economic quality of life. It would have been easier for you to hear a list of specifics: specific jobs, specific curricula and specific timetables. I wish I could offer those to you. I offer you, instead, a recommendation to prepare your students to handle change.

Arden L. Bement, Jr.

I am pleased to represent the industrial sector in this important conference on career opportunities for the future. I am also awed by the tremendous responsibility that many of you have in steering the careers of young talent throughout Ohio. It is a responsibility made even more challenging by technological change.

The next decade will be a period of uncertainty, during which people will have multiple options which they must exercise with intelligence and creativity. There will be greater challenges for industry, organized labor, investors, and lawmakers to be more forward-looking in analyzing the future, anticipating change, and mitigating the traumas of change. We must break the habit of looking at the future as an orderly extension of the past. As one wag expressed it, "the future just isn't what it used to be."

The emergence of microelectronics and the era of "computational plenty" permit new thinking about manufacturing, telecommunications, defense systems, education, agriculture, commerce, and other areas that affect our daily lives. More than ever before it will be possible to "leapfrog" applications of technology over barriers and to break with conventional trends. The number of technological "mutants" over the next five years should be far greater than the number we have seen over the last five years. It is for this future and the challenges it will bring that we must prepare our youth today.

TRW has been called a microcosm of American industry because of our product diversity and the wide spectrum of technologies used in our businesses. TRW products serve the transportation, electronics, aerospace, industrial and energy markets. Our R&D activities are in many of the forefront technologies, such as microelectronics, high-performance materials, integrated optics, high-energy laser systems, advanced energy conversion, space communications and instrumentation systems, and advanced manufacturing and processing technologies. Our high involvement in technology is reflected in our employees. Of our approximately 88,000 employees, 18,000 are classified professional and technical and of this number 10,000 are engaged in research and development activities -- almost one in nine. A further breakdown of our technical personnel would show approximately 2200 electrical and electronic engineers, 1600 mechanical and aeronautical engineers, 1400 mathematicians and computer scientists, 950 physicists, chemists and chemical engineers, and over 4000 other engineering, science and technology professionals. Over the next decade we project a need to increase these numbers by nearly 80 percent to take care of projected growth and attrition.

This projection causes our company considerable concern since there won't be enough new scientific and technical talent to go around, especially as the demand for engineers trained in electronics and computer science continues to increase. In addition to industry's concern about the shortage of technical talent, there is an increasing realization in our society that the science and math "problem" is both far reaching and serious.

The working environment on the factory floor is changing dramatically with the advent of the computer and with greater emphasis on productivity, quality, and competitiveness. The computer is becoming more pervasive. It is being used for product design, [illegible]ine control, production scheduling, and inventory control. Greater inves[illegible]ats are being made in automation, robotics, continuous material handli[illegible]d flexible manufacturing. Job classifications are becoming broader, [illegible]and machine operators are required

to have a variety of skills to be able to set up, run, diagnose, and maintain production machinery. While there are still jobs for stock handlers, tool room clerks, and assemblers, these jobs will decline rapidly with greater automation and computerization. They certainly don't hold a long-term career future.

Increasingly, new employees coming into the factory work force are expected to have structured training beyond high school. Four-year apprenticeship programs are being replaced with accelerated training programs at trade schools and community colleges. Ohio is especially rich in educational institutions which are able to provide excellent associate degree programs in computer-aided design, electronics, mechanics, computerized machine control, computer programming, metrology, and data base management. As a result, many new workers coming into industry have two to four years of college training.

The number of employees in large corporations will continue to decline as a result of both increasing emphasis on automation and plant consolidations and mergers among basic industries. As a result, both the competition for available jobs and the value of jobs will increase. Workers will be given a greater control of production and will have a greater sense of autonomy and responsibility. The all-salaried plant will gain acceptance, especially in "sun belt" states. Supervisors will be expected to be coach, teacher, and facilitator, rather than policeman. Those who will advance in the work force, therefore, will be those having excellent interpersonal and communication skills as well as a strong foundation in the 3 R's. Supervisors will be in demand who know how to optimize human forces and are skilled in avoiding and quickly resolving conflicts.

The major growth career professional fields in industry are projected to be engineering, information systems, finance, personnel management and marketing. These fields are opening up to women and minorities who have both the training and the "right stuff". Students who top off with the high school diploma will have increasing difficulty breaking

into these fields. For example, the opportunities for cost accountants with only high school training already are declining. Those currently in the work force will be vulnerable to being displaced by the computer- and college-trained cost accountants. Higher levels of training in accounting will be required to cope with the complexity of cost reduction problems at the plant and division levels.

Secretaries, too, are expected to have higher levels of training. Most secretaries are now expected to be proficient not only in the traditional skills but also in the use of word processors, electronic mail, microprocessors, facsimile machines and applications software. The associate degree is displacing the high school diploma for the entry level of many secretaries and other clerical workers.

Because of the growing pervasiveness of computers, most college graduates coming into industry today are proficient in computer programming. Furthermore, peer pressures on the older work force to become computer literate are becoming more intense. To attract top talent, industry must make higher-level investments today in personal computer availability.

In addition to their specialty and training, professional workers are selected on the basis of interpersonal skills, communication skills and personal characteristics. They are expected to be oriented toward learning, to have a good attitude toward work, to be a team player, and to set very high personal standards. To get ahead, professional workers are expected first to demonstrate a high level of competency in a line functional specialty. It is for this reason that industry has difficulty placing liberal arts graduates, or "generalists", who have not acquired a skill or specialty.

The emphasis on functional specialization carries over to management training. Industrial managers are expected to be excellent functional integrators and strategic planners, as well as to have strong technical and financial insights. Therefore, MBA graduates who also have an undergraduate degree in engineering or finance are in high demand. For

companies who are upgrading talent in manufacturing and plant management functions, combinations of engineering and MBA degrees are especially attractive. Here again, the MBA intern at TRW is expected to demonstrate competency in a functional specialty before moving up to broader first-line managerial responsibilities.

One of TRW's priority objectives for the '80s is the sustained development of high quality managers and technical specialists. The large numbers of new managers, technical and professional people that must be hired and trained to achieve this objective pose an enormous challenge to TRW. This is especially so in the face of both a decreasing supply of college-educated men and women and the economic ills affecting educational institutions. TRW is mindful of the crucial problems facing universities and has established an aggressive university relations program to lend support wherever possible.

A major element of this program is increased giving for higher education by the TRW Foundation and by company divisions. In 1983, the Foundation increased its giving to education by nearly 20 percent over 1982. The amount given was $1.9 million, not including separate gifts to education given by the operating units of the company. Contributions to education by TRW Foundation represented 40.7 percent of total contributions in 1983, compared with 35.7 percent in 1982. This stepped-up giving is a direct expression of the company's concern for the quality of science and engineering education and its impact on industry.

Merely citing these numbers, however, does not describe the full measure of TRW's response to the current plight of universities. The company has identified targeted programs to address several major problem areas; namely,

(1) the serious shortfall in young faculty;
(2) the shortage of domestic students pursuing graduate degrees;
(3) the obsolescence of computers and research equipment; and
(4) the shortfall in R&D funds.

The programs established to respond to these problems include faculty assistanceships; augmentation fellowships; postdoctorate fellowships in manufacturing engineering to provide for study abroad; equipment gifts and loans; employee training programs, fellowships, and stipends; and special-relationship R&D programs. In addition, top TRW executives have been assigned to 15 key universities of specific interest to TRW to become acquainted with the universities' needs and to marshall company resources to respond to those needs. In many instances it is this direct involvement of company personnel -- as adjunct faculty, as members of visiting committees and boards, or as collaborating investigators -- that is most supportive. Furthermore, as an incentive to encourage contributions to educational institutions by company employees, the TRW Foundation now provides a two-for-one matching grant for individual gifts. In 1983, these matching grants amounted to $216,000.

In addition to contributions for gifts, scholarships, fellowships, endowed chairs, equipment, and matching grants, there are many other ways in which TRW invests in universities. These include university R&D contracts and subcontracts, industrial affiliate programs, faculty consultantships, research grants, employee fellowships and tuition reimbursements, summer employment, and a wide range of direct employee interactions and services to universities. For our Electronics & Defense Sector alone, the dollar value of these interactions, not including personal services, amounted to $9.8 million in 1983.

TRW contributions and commitments to education have been extended to support the upgrading of science education at secondary schools in communities near company operations. These initiatives are intended to extend the base of support for secondary education and to increase the company's commitment and involvement in secondary education. This is an area of activity that is flourishing because of the growing number of involvements by individual employees. For example:

- Over the period 1979-80, TRW played a major role in creating the Cleveland Machine Trades Association and providing grant support to prepare disadvantaged young people for jobs in the work force through the Skills Training Improvement Program (STIP). Part of the curriculum under this program was taught at TRW.

- In 1980, TRW made a grant of $125,000 to Cleveland Public Schools to re-open the Space Theater on Lakeside Avenue.

- In 1982, TRW provided a grant to the Career Education Association of Ohio to underwrite the printing and distribution of the publication Career Education Activities. As a part of this initiative, partnerships between TRW plant managers and career education coordinators were formed in ten plant communities. A number of plant tours, workshops, and seminars for teachers have grown out of these partnerships.

The number of initiatives with secondary schools has grown substantially in 1983:

- A TRW Foundation grant supported a computer literacy summer program at John Carroll University for administrators, teachers and selected students from the Cleveland Public Schools.

- A $35,000 grant to the Educational Computer Consortium of Ohio (ECCO) supported workshops, training and consultation to schools considering bringing computers into the classroom.

- Grant and scholarship support to the CAPS program at East Cleveland High School encouraged minority students to pursue degrees in engineering.

- A $25,000 grant to National Junior Achievement promoted the development of applied economics for young people with business understanding and career awareness.

- A two-month internship program for high school math and science teachers provided a $3,500 stipend to encourage teachers to stay in the classroom by modestly supplementing their salary. It also afforded them the opportunity to conduct a self-generated project at a TRW facility to gain an understanding of industry's requirements. Four internships were awarded for the summer of 1983. This summer the number will be increased to eight internships, one of which has been reserved for a guidance counselor from the Cleveland Public Schools to conduct a project on advancing career prospects for minorities interested in science and engineering.

This brief listing does not begin to represent all of the activities being conducted between TRW operating units and secondary schools. Some divisions are making pledges toward the installation of computer equipment in schools. Our Space Park operation in Redondo Beach, California, has established a multifaceted upward bound program for minorities in cooperation with Harvey Mudd College. This same operation has established unique opportunities for students of North Carolina A&T State University and for explorer scouts to participate in the design and development of experimental payloads for the Space Shuttle Program. Of course, the resources available for such initiatives are finite. However, the programs and interactions underway have proved highly beneficial due to the imagination and ingenuity of TRW's employees.

The plants and divisions within TRW take responsibility for skills development training at the factory and line staff levels. These programs are hard to characterize and quantify because of the decentralized nature of TRW and the wide variation in these programs. Management programs tend to focus on organizational dynamics, productivity, and leadership in employee participation. Some plants are also introducing state-of-the-art, modularized technical training systems on the factory floor. For example, TRW's Gainesville bearings plant in Georgia has fully implemented such a training system in which videotapes and manuals are employed to facilitate self-training. Under this self-paced training program an employee must

demonstrate to his supervisor the attainment of proficiency at each of five skill levels for a training module. Wage increases are awarded for each level of demonstrated attainment.

Short-term and long-term pressures facing industry today are enormous. Companies and whole industries which will survive in the future are those that are dynamic and can anticipate and cope with change. It is important for those who counsel high school students to become intimately acquainted with these changes and the competitive forces that will shape career opportunities for the future. For this reason, I applaud the sponsors of this conference and encourage a close, continuing dialogue with employees of TRW and other companies in the greater Cleveland area.

ALLEN OLGIATE

Thank you for inviting me here today to speak as a representative from the high technology industry. I'm going to be brief; many of the things that have been discussed earlier I won't belabor.

Automation is here and it affects each and every one of us, probably even more than we realize. It affects businesses, it affects industries, it affects hospitals, it affects schools and it affects us in the home, where computers are being used more and more. Taking that a step further, it affects our children, our future job force, even more than it affects us now because of the advancements in technology.

Let's get away from the phrase "data processing" for the moment. Let's call it "information processing" or "office automation". In Wang Laboratories, we define "office automation" as "people in offices using technology to meet objectives effectively". Let's focus on what comes first: people. People using technology; and technology is the middle ground. Technology is a tool for people. The last word in that definition is "effectively". And that's not a mistake -- we use the word "effectively" instead of "efficiently" for a reason. Through the use of automation I can produce twice as many materials. Is that helping me to improve the quality of information? Not really. The key is effectiveness -- using technology and the tools to create an effective application. I can

make a more effective business decision which will help my bottom line. (That word -- bottom line -- has been thrown around many times today, but profit is not a dirty word.)

There are new trends in office automation. We talked about robotics a little bit today -- that's an area of automation. There are particular characteristics to the new era of information processing, or office automation, that we're in right now. Centralized coordination is important -- the coordination of information, not the coordination of data processing equipment. The era of the backroom computer is gone. The computer is still there, but it's there for a single purpose. The systems being used today are decentralized in nature. They are getting closer to the people who are using them. That gets us to the next point -- today's systems are user driven. Users are demanding that they have more information at their fingertips and at their desks so they can do their jobs more effectively. That's what we're trying to accomplish: getting it to the people. They want word processing capabilities, they want spreadsheet applications for forecasting, they want applications specific to the jobs that they're trying to accomplish. They don't want a computer there just for the sake of having a computer and rolling some numbers around. They want to be able to use that information.

Personal computing has really aided and enhanced this era of decentralized information processing, if you want to call it that. In the last two years there has been a proliferation of personal computers; every major computer manufacturer has its version of the personal computer. It is a tool: it's a tool for managers, it's a tool for clerical people, it's a tool for secretaries, it's a tool for executives. And they are dictating to us what they want that tool to do. They want it to communicate information. They want to make sure that the information they're gathering comes from a number of different sources and is compiled so they can get all of the information they want in one report. So we're now

getting into multifunctional systems, systems which are capable of doing many diverse things. Ten years ago a computer could not do data processing and word processing concurrently on the same system; now those functions co-exist on one piece of equipment, letting you do more things.

Take a look at what the basics of office automation are. Traditionally we have data. (Data processing, getting back to that phrase.) Data processing is numbers in such structured applications as payroll, general ledger, accounts payable and accounts receivable. Business functions. Then there is text processing, a form of word processing which is unstructured. Words instead of numbers. You can put them anywhere you want; change them, move them around, print them out. There is also image processing -- taking the words and numbers and displaying them in a graphic or pictoral representation. A picture is worth a thousand words.

Another office technology involves voice information, a common form of communication today in the business community and throughout the world. Picking up a telephone is commonplace. You don't even think about it any more. But what can I do with that voice? Today, there are systems on the market -- Wang has one of them -- with which we can digitize the voice and do such things as send it to somebody else and have it play back, send it to someone else for action to be taken. It's a messaging system. Where is it going from here? Wang is heavily involved in research and development on voice application. Speaking into a computer terminal isn't that far off. Voice recognition is an area that is being very heavily researched today. It isn't perfected, but it's not too far in the future. What can we do with it? It will be interesting to find out. It's the next frontier in office automation.

All of this ties together with networking: now that I have data and text and voice information and image processing, what do I do with it? Do I keep it within my own office? I should have the ability to send it

wherever I want, within the organization, to another floor, across the country or to someone in any other part of the world. That technology is here today. Cabling is a reality; it's taking place right now. You will be able to do many things right from your home. It's going to be far-reaching; it's going to have a lot of impact on how we conduct our business and personal affairs.

The last element of office automation is the human factor. How do we present or prepare a product and make sure it is accepted, easy to use and simple to learn. Those are the elements that we consider necessary for office automation. Now how does that affect the job market? Data processing: there are analysts, technicians, programmers; they are going to be needed tomorrow, next year, and ten years from now, and that element of the job market is going to be vastly expanding.

Where is the market expanding? It's expanding in services, in professional people, in clerical help. It's the users that we have to address, not just the people who prepare, program and deliver information.

So what do we do? We have to make our young people computer literate today, in the schools. We have to make sure that they're capable. We must make sure that the students in school today are not afraid of automation, because they're going to have to live with it for the rest of their lives. It's here. We want to make sure that they know how to use the keyboard -- basic typing skills. Not just secretaries, but anyone -- people going into business, accounting, engineering. They should be able to get around a keyboard. They should be able to deal with the applications that are being used on a computer. They don't have to learn how to program; they don't have to know what a bit or a byte is, but they should know the components of a computer: what disk storage is; what memory is; what a computer can and can't do; so that they understand it enough not to be afraid of it.

That can and should be taught in the elementary schools. Before they get out of elementary school, kids should know the basics of a computer, what it can do, and what it can't do. Once those kids are in high school, the automated systems can be employed within the course context itself. In science courses, math courses, engineering courses, there can be real applications, giving kids the ability to see precisely what this computer can do. That's what students should be learning right now. We're seeing many of them come out of the school system with no knowledge of the operation or utilization of a piece of automated equipment. Those people that have that basic knowledge will stand a better chance in the job market because those skills will go with them forever. They will be able to utilize the technologies of the organizations that they're going to work for.

I'm not an educator; I'm not a programmer; I don't know how to develop an educational plan to teach computer literacy and give our children what they need to survive in the years to come. That's your task. We're available, and our home office in Boston, Massachusetts is available, to respond to your questions about automation. But it must be a dialogue. We know which way industry is going, we even know which way technology is going; but in most respects we're not educators. If you could help us in that respect, we'd be very appreciative.

LARRY COON

Hi. My name is Larry Coon and yes, there is a Hamburger University, and I'm the Dean of Hamburger University. So what can a hamburger dean tell you about schools? Rather than get too far into the future, I'd like to talk more about what's going on right now -- what we are doing, what is the state of the art in industrial training, at least within McDonald's. And what can we as educators do to educate our children, our students, better in the future?

One of the questions I often get when people find out I'm responsible for training within McDonald's is how do you motivate those crew people? How do you get them to smile so much? How do you get them to be so happy? How do you motivate them? And they also say boy, I wish I could motivate my students that way. I've got some good news and some bad news. We can't motivate them. You can't motivate them. All we can do is set the climate for them to motivate themselves.

People also often comment that they hear how great our management depth and strength is, and they wonder how we go about doing that. Pretty much the same way. We can't motivate our managers; all we can do is set the climate for them to motivate themselves. That's what I'd like to talk about a little bit. How do we set this climate? How do we get crew people and management people to be so motivated and so active and so eager to learn and strive ahead?

I'm safe in telling you this because it's something our competition can't steal. They can steal our buildings, they can steal our design, they can even get some of the same products into their restaurants as we have. But something they can't steal is our culture, our philosophy, the value system under which we work within McDonald's. I think it's one of McDonald's secrets of success, and I'd like to share some of those important values that we have. We use them in the operation of our restaurants, we use them as we train our people. A lot of them were in In Search of Excellence* if you're familiar with that book. One of the values McDonald's has had from the very beginning is to be an action company. We look for people who are energetic and willing to move, and move fast. Our second value is to be a hands-on company. We believe in doing. Everyone within the operations corps of the company, from the Chairman of the Board on down through the first management person of any store that you walk into has worked within a restaurant. Most of us started within the restaurant. The only exception to that is our current president -- he started in the mailroom. Then he went to the restaurant. But we all have worked within the restaurant, and we know what's going on there. Third, we believe in the importance of the customers; we listen to the customers.

Our control system is what we call a loose-tight kind of control system. Some things that are very important, we have a tight control on. In some of our restaurants we've got 21-year-old managers, really kids just out of school, managing a restaurant that's probably going to do on the average of $1.2 million in business. A 21-year-old kid managing that kind of a business. Our whole company is young. One of the ways in which we manage that is through the controls -- tight controls. We also have very loose controls, in that we give our people a lot of freedom to work within their areas of authority.

*Peters, Thomas J. and Robert H. Waterman, Jr. In Search of Excellence: Lessons from America's Best-Run Companies. New York: Harper & Row, Publishers, Inc. 1982.

The last important value we've got is our belief in people. We sincerely care for people. We listen to our staff people and we listen to our customers, as well.

And we pay for performance. One of the speakers this morning spoke about merit increases for teachers, and I agree wholeheartedly with that. We have a pay-for-performance system within McDonald's; we give periodic performance reviews and wage reviews based on performance at least once a year, sometimes more often. The best performers get the best pay. They also get the promotions and the recognition. And through that method we believe we challenge our people. We have challenged them to be more than they thought they could possibly be, and we have taught them not to be surprised when they reach that level.

Let me tell you a little about our training system. We've got over 8,000 restaurants. (At least I think it's close to that. At the end of the year we had 7,778; we open a new restaurant about every 18 hours, so by my guess we've probably passed the 8,000 mark.) We're all over the world in 30 different countries. We've got 8,000 areas where there's training going on -- at the store level. That's where we train our crew, that's where we train the beginning managers. And we have regional offices -- about 60 of them worldwide -- and that's where secondary level training goes on. That's where first assistants, or manager trainees, and second assistants go for training. And we've got one world headquarters and one world international training center called Hamburger U. There we teach assistant managers who are ready to be promoted to managers, folks who are going to be new operators. Many of our students then come back as they work their way up through the corporation.

As an aside to what we do, because we do a lot of industrial training just for McDonald's, a couple of years ago we had the American Council on Education come in and evaluate the 18 different courses that we teach at Hamburger University and they came up with a list of recommendations for college credit for those 18 courses. So overall we can

offer a total of 40 credit hours for our students as they go through our various courses. Now Hamburger University is not a real university; we can't award actual degrees. We do give a Bachelor in Hamburgerology but it doesn't require four year's work. (We're tongue in cheek; we smile at ourselves too.) It's not a four-year degree; it's a two-week degree. They come in for two weeks as a capstone to about two years of intensive training that they get at various places within the company. A year or two ago we applied to the State of Illinois and we received permission to operate as a division of Hamburger University a two-year community college which we call McDonald's Management Institute. We're in the process of putting that curriculum together for this fall and we'll then offer college-level courses for our people. Our intent is to go back this fall and get authority to grant degrees.

The other thing I might mention to you is that our training is criterion referenced. We expect everyone to pass, and if for some reason they don't meet the criteria, then they cycle back through until they do. We're quite heavily involved in something we call training payoff. That means we communicate to the bosses of our students what the learner objectives are. We communicate what the objectives of the class are. Then that boss and that student determine what is important for that student to learn. The boss tells that student how he or she will be measured in the achievement of those goals. A student then takes the course, paying particular attention to those classes which are learner objectives for them. They write some goals as to how they're going to accomplish those objectives when they get back. Then they go back to work and are measured by their boss.

We are installing right now a student response system, a hand-held calculator that feeds our students' test answers immediately into a computer. All of our tests are tied into the learner objectives. When we send back a report on a student, our goal is to have tied each of those test questions to the learner objectives. In that way we communicate to

the boss that yes, in fact, your student has learned this information. And you should expect them to accomplish this objective. Or, they did not learn this information and you're going to have to work with them before you can expect them to accomplish that objective. So those are the two areas in which we're working: criterion referencing and training payoff.

An important concept at Hamburger University is to be sure the students have fun. I use the expression "KISMIF". Maybe you've heard of KIS, which means "keep it simple". MIF means "make it fun". And we do. We have lots of fun in our training because our belief is that when the students are having fun and the teachers are having fun, there's a lot more education going on. Another concept is to use operations people as our staff. I've got a staff of 32; 20 are instructors at Hamburger University and the other 12 are curriculum development people. All of those folks are from the operations department. If you're going to make decisions or do training that will affect the restaurants, then you need to have a knowledge of how those decisions, how that training will affect people in the restaurants. It gives my instructors instant credibility when they walk into the classroom. Not only have they had the job of the person they're training; they've also had the job of the boss of the person they're training.

How can you use these values and concepts within your systems? You know better than I. Something that comes to my mind is that you get out into the community more, find out more what industry is doing and how the things you're teaching will affect your students later. Our training is measured and followed up by the boss. We have responsibility and accountability. How can you manage that? How can you be held accountable and responsible? The merit pay system is one way to do this. Feedback from past students and from the industries where your students go is certainly another way to measure training effectiveness.

I mentioned earlier that reward for performance is very strong within McDonalds. We pay for performance; you can too. I bet if you really think about it, maybe you're already finding ways in which to reward those students who do well. Special seats at the basketball game; special considerations somewhere else; special time off, special time within the library; computer time; whatever those students want, whatever they see as rewards, are really pay. They don't have to be monetary. Just plain recognition for a job well done also is a reward. That's one of the things that we find challenges people, that sets the climate for them to motivate themselves.

When our students return from class their bosses say to them, "Okay, now that you know it, show it..." Now that you've learned it, now that you've got the knowledge in your head, apply this knowledge. We do a lot of applications learning at Hamburger U. as well as follow-up by the boss, so that student has the chance to apply the knowledge that he or she has gained. We also measure our training and seek feedback; we're constantly striving to make it better. And I know you do the same.

At McDonald's we challenge our people to get them to grow. Maybe you've heard the notion that people resist change. I say to you it's not true. People don't resist change; they resist the method that is used to make a change. You want to get your students more active in class? The trick that we use is getting them involved in the content that is going to be taught. Get their ideas and their input on what they see as valuable, on what they feel is needed to help them progress through their career. If they're involved in the decisions that make or affect that change, they'll welcome it, because nobody tears down something that they help build up.

Finally today, I'd like to share some personal philosophy with you. It's a philosophy I teach at the University and use in running the University, as well. It's really a two-part philosophy. The first part is that the further away from a problem you are, the easier it is to make a

decision, and the greater the likelihood that decision will be wrong. That's very true. When we try and make decisions as managers within our restaurant but don't involve the crew, we find very often that the crew has the answers that we're seeking. We find that our students have the answers to many of the problems we seek solutions to, and I would guess that your students might as well. If we try to develop something only from the management view, it could very well be wrong because we aren't down there in the trenches. For those of you who are supervisors, superintendents, or administrators within your school system, I say listen more to your teachers because they're the ones that are down there in the trenches, they're the ones who know what problems they're dealing with and what help they need to solve those problems. The last part of this philosophy almost sounds contradictory to the first. It says that the closer you are to a problem, the easier it is to accept excuses as to why it can't be solved. That also is very true. One of our jobs as bosses, one of our jobs as educators, is to keep challenging our people not to accept excuses, not to accept mediocrity. Let's not accept incompetence. Instead, let's challenge our people to be all that they can be, and let's teach them not to be surprised when they succeed.

DR. RONALD ZAMBETTI

It is indeed a pleasure to be with you this afternoon. It's always interesting to have the opportunity to speak last on a panel. Three things might account for that: a) It can be an indication that you have the most significant contribution to make; b) It can mean that people have seen your material and they think the end is where it should fit; or c) It can mean that your contribution is a unique way to bring closure to the preceding concepts in this most important direction. I have been asked to share with you the directions that two-year institutions in the state of Ohio are taking in attempting to respond to the needs of the youngsters who come to our educational institutions. Will there be places for them to go? We must respond in all sectors to make sure that those who invest in education find that they can apply that education to the occupational opportunities that will exist.

In the two-year institutions in the state of Ohio and throughout the country, many significant and exciting things are taking place. They are not unique to Cuyahoga Community College; but they are new in that we are changing from problem identifiers to problem resolvers. In the two-year institutions throughout Ohio it is common practice that every student who enrolls is given a student assessment plan. We take very seriously our ability to take a student where he or she enters the university or college and apply his or her academic resources to a plan that will allow that individual to succeed.

Community colleges are utilizing the individual learning plan. Much emphasis is being given to counselling and support staff and what we refer to as academic management and academic counselling so that individuals who want to explore the horizons and take advantage of the very sophisticated research and development data that is available can begin to build around their skills and their individual learning capacities a plan that will allow them to accomplish their goals. That plan might be a one-year certificate program, a two-year advanced technology training program, or a four-year institutional degree program.

At Cuyahoga Community College and 127 community colleges throughout the nation, there is a support PLATO computer-based enhancement program, which means that if a student wants to come to our institution and outline a two-year program, he or she can cut the in-house learning time in half by taking advantage of what we refer to as the computer enhancement data applied base program. That individual can take the information that has been supplied on our disk computer capacity and can work through his or her degree commitment on a self-paced program.

Two-year institutions are taking the lead from four-year institutions and from the private sector in utilizing all of the research data available on occupational trends, occupational forecasting and population trends. No longer are educational institutions being perceived of or perceiving themselves as little academic islands out there where we're not willing to share data. We keep current on the educational forecasting and occupational trends of 14 major Cleveland corporations; we work very closely with Cleveland State University on population trends and business forecasting; and all of that information is worked into an individual program design for each of the students who comes to the two-year institution.

I'm pleased to share with you that in the state of Ohio there are over 140 occupational career programs designed for what we call community

response. In a short period of time a student can come to such a program, retrain, enhance his or her technology skills and be ready to re-enter the work force with a new opportunity and new horizons. In our engineering program, and probably in your high school or college curriculum, you hear more and more about the CAD and the CAN process -- the computer assistance design and the computer numerical capacity within computer based programming, which will allow students -- especially those who are strong in math and science -- to take advantage of academic theory as well as the new applied core curriculum for the advanced technology opportunities that exist. By working with such institutions as St. Vincent Charity Hospital, Cleveland Metropolitan Hospital and the Cleveland Clinic we are responding to the need of technicians in the biomedical instrumentation programs. You may be aware of NMR -- Nuclear Medical Residence -- programs for advanced technicians with potential to 2 + 2 with four-year institutions.

The readiness and ability of students to adapt to occupational needs is our collective responsibility; it is not the responsibility of business and industry, it is not the responsibility of four- or two-year institutions, or the high schools or elementary schools. It is our responsibility as professionals to band together, to share resources and to agree upon a directional educational plan that will allow for maximum participation by the individuals we serve.

What is Cuyahoga Community College doing to respond to the needs of advanced technology? In June of this year we will be breaking ground for an $8.5 million advanced technology center with a capacity of 96,000 square feet of advanced technology training. This center is in response to the cry from business and industry, it is in cooperation with the four-year institutions, and it is consistent with the data that we have collected over the years that indicate we must respond from a hands-on approach as well as an academic approach to assure that students have occupational readiness skills. This will be the most advanced high technology training center in the state of

Ohio and the second most advanced in the country. It will be staffed not only by thefaculties of Cuyahoga Community College, Cleveland State University and Case Western Reserve University, but also by the high capacity training and instruction faculty of business and industry in the Cleveland metropolitan area. What kind of programs will there be? What is there that will lead you to go back to your schools next week saying, "There is an opportunity, there is a great chance that will be built on the metropolitan Tri-C campus in downtown Cleveland"?

The proposed programmatic design for this facility includes robotics repair, design and application; laser optics; computer numerical control; biomedical instrumentation control; computer assisted design; information processing; and telecommunications design. Telecommunications design will interlink the major universities throughout the country in such a way that in this facility there will be the capacity not only to research academic projects that are going on but also to forecast where the jobs and opportunities will be throughout the country. We are participating in what is called the Associate of Technical Studies degree for the first time in the history of Cuyahoga Community College and the state of Ohio. We now can articulate fully with the proprietary schools in Cuyahoga County and the State of Ohio to take advantage of their comprehensive skill development training, transfer that back to the institution, use that as a catalyst and move forward as we encourage all of our students to go on to the four-year institutions and acquire the degrees that are being sought by business and industry.

What are we at the two-year institution recommending to our colleagues here in this room as a support and help base? If you don't have one, I encourage you to get a copy and read the Ohio Board of Regents Advisory Committee publication on articulation between secondary schools and Ohio colleges. They make some clear and direct recommendations which we wholeheartedly support. And I'm sure you have read the report called "A Nation at Risk"* which was done

*"A Nation At Risk: The Imperative for Educational Reform." The National Commission on Excellence in Eduation, April 1983.

by the National Comission on Excellence in Education.

I have for you today six recommendations that come to you from Cuyahoga Community College, as well as the other two-year institutions of our state. The first is to encourage, if not require, enrollment in physical and biological sciences with a clear direction of outcome. We find the youngsters who come to us -- I say youngsters, but our average student is 26.8 years old -- really do not have a clear understanding of how theory is translated into application for advanced technology skill upgrading. Number two is to encourage greater emphasis on mathematics, a song that has been sung throughout our nation. Three: to lengthen the academic learning schedule at the secondary school level to increase students' tolerance for the college learning setting. Our advanced and emerging technology requires that math and science be taught in an hour and 20 minute- to an hour and 45 minute-blocks. The traditional blocking at the secondary schools is 45 minutes to an hour, so when these youngsters reach college it is difficult for them to sit through an hour and 45 minute, very concentrated and power-packed class.

Recommendation number four is to enhance the skill development process of written and oral communication skills. Every year we ask business and industry, "What is the one thing that you wish our graduates had as a basic skill?" And they say, "The ability to write, both on a general communication and a technical level." Five: To incorporate into all instructional tasks a self-managemen skills awareness program. As my colleague from McDonald's was saying, we need to instill in our students that they must possess skills in self-direction and independent performance; that it is up to them to become independently directed towards seeking knowledge; and that their future depends on their efforts toward identifying directions and seeking out information. High tech skill development will not come knocking at their doors. They must seek it out, and they must use the data. It is our responsibility to make sure they know the data is available, but it is their responsibility to seek it out once they know about it.

Sixth and perhaps most important in my view is that we must encourage a faculty exchange program. It is absolutely imperative that our faculty get into the secondary schools, get into the proprietary schools, and sit in on classes at the four-year institutions, so the philosophical framework for information deliverance and exchange is on the appropriate wavelength. We want the secondary schools to be able to share with us so that the information being exchanged at both levels makes sense.

Based on those recommendations, I say to you that education in the state of Ohio and education throughout the United States is healthy, and is embarking on the next step: striving for excellence. We will only accomplish our goals if we come together in bodies like this to exchange and examine the resources that are available and to determine how we can apply them in our own institutions.

DR. LEWIS PATTERSON

Until Tuesday afternoon when I was asked to fill in for Dr. Cunningham, I was planning to come here today and spend a nice relaxing time recharging my batteries and finding out what public school educators are thinking about, and suddenly I had to start thinking for myself a little ahead of time. It is true, as my introduction noted, that I have been doing some work with the planning activities at Cleveland State for quite a while. However, it's a large challenge when somebody asks you to represent four-year colleges on a panel to decide what ought to be happening on the education scene. I thought a good bit about it. I find that as today's program has unfolded, many of the things that I was thinking about have been discussed already, so I think I'll be able to build with that. I'm going to try to do two things: to look at how the colleges and universities are planning for the future, and to look at the question of what this may have to do with the public schools' getting people ready for a college experience.

I am going to begin in this future-oriented conference by looking back. The changes that we're talking about are primarily these: population trends, change in the work force which is an outcome of the technological revolution, and the impact of technology specifically on the educational process. So those are the three kinds of variables that all of us in a planning situation need to take into account. And as I say, I'm going to look back to see if we can determine the appropriate role of the four-year

collegiate institution in the face of these three kinds of changes. How is it the same and how is it different?

If we look back over the past 125 years or so at the four-year colleges of America, we will find that they have focused on two primary missions: One is the education of students in liberal arts and humanities so as to prepare them to more deeply appreciate self, others and environment -- this education I see as providing for the enrichment of life, and as sowing the seeds of wisdom. It's a very broad-based kind of purpose, and it is in many respects the preservation and the transmission of a culture to a new group of thinkers.

The second mission has been that of preparing students for some kind of career performance. There's been a continuous debate -- I think probably for the whole 125 years -- about which of these ingredients is the more important, and how much of each should be included in an educational program; so you find the arts and sciences faculty looking down their noses at the engineering faculty or the education faculty, saying, "We have the real truth and you folks are the technicians." And you find the technicians looking back and saying, "You may have the real truth, but we're the people who help the world figure out how to work; we're the people who are creating the new world." There is no resolution to that kind of argument; it seems to me that both missions are indispensible and that they both continue to be as fresh as they ever were for the universities in the face of new technology and the changing population situation.

Cleveland State University has a mission statement and it was interesting to me in light of the previous comment to look at what it says. "Cleveland State University will strive to strengthen its role as a primary intellectual and cultural force in metropolitan Cleveland." There you have the repository of the culture of man, if you will. The second part I won't read quite so word-for-word, but it's basically that Cleveland State will fulfill its role as a public institution in preparing

people for the jobs that need to be done in our community and will address some of those problems directly through some of the action research programs of the university. And that, I believe, is what we ought to be doing as a university.

Now faculties, and particularly arts & sciences faculties, tend to see the humanizing influence of broad education as a higher calling in vocational preparation and they see the preservation and further development of the traditional disciplines as the central role of the university. And I find in the ethos were I work day by day that this is indeed the high priority that the faculty holds. I oftentimes find, however, that the public is focused more on effective vocational preparation, particularly in times of dislocations in the work force.

At present, the demands in the world of work are changing so rapidly that the vocational preparation aspect of the college curriculum is evolving into lifelong learning programs. Adults will be likely to continue adding short, career-oriented segments of training to their educational background throughout life. The old approach of getting your four years in, having your education done with, and being ready to get on with life certainly doesn't represent reality as I see it; and it doesn't represent the reality that's in this room right here today, as a matter of fact.

Population trends represent an important issue in the planning process for colleges and universities right now. There will be 20 percent fewer 18-year-olds seeking to enter college in 1990 than there were in 1983. If you want to be crass about it, that represents 20 percent of the jobs in the university. If you happen to live in Cuyahoga County, that figure is 40 percent fewer. So there is some real concern about what the universities are going to do in the future in terms of their own self-interest. At 1990 and beyond, the trend begins to shift moderately back in an upward direction; and in fact those of you who are in the public schools are already beginning to see that the lower grades are a little

larger than was true for a period of time. The good news is that nationwide, we're going to need a quarter of a million new elementary school teachers between 1980 and 1990. But that shift hasn't hit the colleges yet, and in fact we are still looking forward with some trepidation to the bottoming out of the population slump that you have already experienced. Samuel Dunn, in a recent article that was cutely titled, "The Case of the Vanishing Colleges",* predicts that 25 percent of today's residential liberal arts colleges will be closed by the year 2000 and that another 15 to 20 percent will be in serious trouble. Why? The people aren't there for business as usual, so if business as usual has been your style of planning, you're likely to be hurting.

Now what Mr. Dunn suggests as the alternative to vanishing is exactly what most of the colleges and universities that I know about have been trying to do. First of all is the emphasis on improvement of the traditional programs for 18-year-olds, with a return to more rigorous study as a basis for lifelong learning and adaptation. Even though they were talking about the high tech world, three of the speakers this morning said that what they are looking for in their new employees is people with a broad education. The universities are the institutions that historically have provided such people, and one survival tactic has been "make them better". A direct result of that is that virtually all of the state universities in Ohio changed their admission standards within the last two years as a result of a joint recommendation of the Board of Education and the Board of Regents. We are saying that we want better-prepared people, and that if we get better-prepared people we're going to bring them to new levels in the acquisition of wisdom, if you will. So that piece is going on, and it's been successful in a lot of places. My assignment before coming to Cleveland State was at Boston University. In about 1970 Boston University was beginning to experience some very serious economic problems, and the solution that

*Samuel L. Dunn, "The Case of the Vanishing Colleges," Futurist, 13 (October 1979), p. 385

the new president suggested for this was to become a better university; he began emphasizing excellence, and within a five-year period the red ink disappeared. I think it works.

But there aren't as many 18-year-olds. Even if we get a larger proportion of them, it probably still doesn't result in the kind of enrollment stability we're looking for. So what we have been doing -- a second survival tactic -- is moving toward more services for the adult. This comes in several forms. One form of service is the nontraditional Bachelor's degree programs: external degrees, credit for life experience, and other programs to bring adults into the fold of educated persons. In addition to trying to make it easier for adults to get a basic degree, we have also been focusing increasingly on short courses of a vocational and technical nature, on and off campus, oftentimes in cooperation with business and industry or the public schools. This has proved to be a fairly successful response at Cleveland State. And a third tactic -- and an important one in my view, since it represents my own special interests -- is expanded graduate professional programs of all kinds.

This combination at Cleveland State University has resulted in a stable enrollment over a period of time when the demographers were saying that a stable enrollment was not possible. This has been in part a survival strategy, but the reason it has worked is that it has provided a service to the public that the public was willing to buy. It fulfilled a need. You can't sell a program if people don't want it, and I think we've been fairly successful in determining what it is that people want and need.

Speaking more directly to technology, it has of course a very fundamental influence on the way that universities and colleges have changed and will continue to change, on the changes both in the educational process and in the product -- the graduating student. In a process sence, those are so obvious that they're hardly worth elaboration. The availability of microcomputers, mainframe terminals, new software, etc., is increasing

at an overwhelming pace, and university professors (this one included) are scrambling like everyone else to gain the skills that are needed to use the new technology. It doesn't matter whether you're in a technological field or not; we're all scrambling today to get that new means of acquiring information. At the present time in the little department I operate, we have one of Wang's word processors and a microcomputer, and within a couple of months we're going to have three terminals onto the mainframe. The terminals onto the mainframe will lead to our joining the electronic mail system which is already in operation within the university. At Cleveland State we are already hooked in a network with 40 other universities nationwide, so that if I want to write a paper with somebody at Penn State, for example, I can do my draft and it will appear on his terminal over at University Park. That kind of thing is here right now; that's not tomorrow. And it greatly enhances our ability as faculty to access information and to provide that same kind of access to students. Those things, as I say, are here.

From the view of a career psychologist, however, the question of the graduating students' needs is a more interesting one to me. The age of technology seems to be leading us to a point where fewer people will be required to do the work of the world. I've talked with people from business and industry -- General Electric Strategic Planners, for example -- who are saying that we must be prepared for the fact that there will be permanent unemployment. Don't expect that we'll ever get to a point where everybody in our society is able to be employed. The jobs that have been lost to technology are not going to return with the economic recovery, and that's particularly important for us in northeast Ohio to know because we're in one of those areas where those jobs have disappeared. The population of the 21st century (and I think Marvin Cetron alluded to this this morning) will be increasingly polarized between those whose technical skills are highly developed and constantly growing and those whose work is very routine. Dr. Cetron pointed out that for every one of the former there will be six or seven of the latter.

It seems to me that the new challenge of education is the preparation of people to face a life of minimal employment in a way that maintains quality of life and self-respect. That's a hard order, and I'm suggesting it to you as well as to myself. The concept of an America oriented around personal identity routed in one's employment will be available to only a part of our population; for the others, there must be alternative routes to a life of dignity and fulfillment. I'm not sure how this will be accomplished but it seems to me that a curriculum that emphasizes the appreciation of human accomplishment and participation in that accomplishment in some way has to be a part of that future.

What does this mean for the schools? Well, I think it's fairly obvious from what I've said thus far. The colleges' higher admission standards are related to a new push for academic excellence. It means that we would like to receive students who are as well prepared as possible. I feel kind of funny saying that because I am a former public school teacher, and since moving to the University I've always been sensitive about the old pecking order -- the colleges blame the high schools and the high schools blame the elementary schools, and you run it down through kindergarten, the nursery schools, and home. We're all in this thing together; I don't think it's anybody's problem or anybody's fault or anybody's accomplishment alone that kids turn out a certain way. We're all a part of this. To the degree that people are capable of developing academic excellence, including communication skills, calculating skills, human relations skills, they are likely to find themselves in the future among those who will run the world. To the degree that they don't develop academic excellence, they're likely to find themselves in the ranks of those for whom employment may not be the central organizing theme of their lives.

Students who are strong in the sciences and mathematics, including the computer, stand a greater chance than ever before of moving into the group that will manage the world in the next generation. Thus, it would seem to me that all of us who are in the business of educating should help

young people understand the sorting process and to prepare themselves in mathematics and science to the greatest degree possible. It has long been true that the simple act of choosing not to take mathematics beyond arithmetic eliminates well over half of the jobs that are available in our society -- the half that carries both prestige and material reward. We must be sure that young people make informed choices.

But it is also important to help young people understand that it is acceptable for them to choose educational and work experiences that are not centered on technology. Some people just don't care for the mathematical and scientific content and some seem poorly disposed to learn it. The world will still have many opportunities in government, the social service fields, the service industries and the information industry. Many of these opportunities will require a minimum of technological skill. But the work may be menial in some instances. A final implication for all of us, then, would be the need to educate people in the arts and humanities so that there will be a core of learning about human accomplishment that can enhance the life of the mind regardless of employment.

GARY HOLLAND

I hope we'll share some information today that will provoke some thought and give you a good understanding of how this government, this administration, is attempting to revitalize Ohio.

Rather than risk your leaving here with misinformation, there are some points from Dr. Cetron's talk yesterday that need to be corrected. Dr. Cetron talked about the vocational/technical education system in Ohio and said that Ohio should be the robotics capital of the world, but that the governor is sitting on his hands. He also said that if this region would show some leadership it could compete with the sunbelt, but that the governors and the people in state governments in Minnesota, Pennsylvania, Wisconsin, Michigan and Illinois aren't doing anything and that we should not, therefore, expect much coming from these particular avenues.

I think instead of talking about his encounter with the future, we should have an encounter with the immediate past -- and that was yesterday. I wasn't sure if he was talking about Governor Rhodes or Governor Celeste. If he was talking about Governor Celeste, then he should know that we have a very strong presence on the Joint Commission of Vocational/Technical Education, that a report has been issued, and that during the campaign for the 1982 election we talked about the need to avoid duplication, and we talked about the need to have coherent and coordinated planning among the Board of Regents, the State Board of Education, and throughout the whole of the Vocational/Technical network. Well this Joint Commission on Vocational/Technical Education sought to target those objectives and the report has been disseminated, at least throughout the education system, for those

interested in vocational, career and technical education. That was just one small step, and at the risk of sounding parochial or certainly partisan, I could have directed some correct information at Dr. Cetron yesterday so we could have had an encounter with the present.

The important thing I think Dr. Cetron should be aware of is what we are going to talk about today -- the Strategic Plan. We talked about the first phase, Toward A Working Ohio, which we think is going to set the stage for revitalizing the state's economy and putting people back to work. The Governor has convened a working group called the Cabinet Cluster with a lead agency with employment services to accomplish some of these aims. We think that for the most part, that process has been successful. The next step is Phase Two, dealing with education and human resources, something that I'm sure all of you will want input into because a draft document will be released in April and we will ask for input from the educational constituencies and from the human services, health-related and welfare-related constituencies and interest groups. We think that what we come out with there in terms of the Strategic Plan is going to set the stage.

Dr. Cetron also taked yesterday about having or not having a regional strategy. I would like to point out that the Great Lakes Governors Conference is very, very active. Governor Celeste has dealt with equipment questions and tried to upgrade the industry and work with business leaders from across the state and to have them interface with their counterparts in other Great Lakes states. I think it's to our credit that this kind of cooperation among Governors Thornberg, Thompson, Celeste and others will help bring about changes in our legislative agenda on the national level. This administration also sees a need for sharing a regional tourism strategy and for taking advantage of our best resource, the water that we all control and share. We can hold the sunbelt region hostage by not giving our water away, so Dr. Cetron will find out there ain't no dummies in Ohio when it comes to that issue.

Gary Holland

When Mary first invited me, we had a meeting with the steering committee and we talked about what the fueling of the education explosion is all about and found that it coincided with the prerogatives and iniatives that we were trying to accomplish at the state level through legislative administration. I looked through each one of the pamphlets and the registration booklet: "Ignition!" and "Intelligence and Schooling", and now we're at Conference 3, "Career Opportunities for the Future". We feel that what you're doing here can supplement what we want to do at the state level, and that the work you're doing here will be very helpful. I would invite you to participate in the review and comment period for the second part of the Strategic Plan; Paul Rogers in the Governor's office is the person who's coordinating that effort.

But we've gone from Ignition to Intelligence and Schooling and now to Career Opportunities. I went back to the proceedings of Conference 1 and looked at the paper Michael Annison presented to the conference, in which he dealt with the implications for education. Many of you know that Annison is involved with the group out in Denver dealing with the whole Megatrends issue which Dr. Cetron obviously took exception to in many regards. But Michael focused in his paper on education, which was omitted from the book. He said something that has changed about the economy is that when capital was the strategic resource, women and minorities simply were not part of the economic system. Now that intelligence has become the dominant resource in business ideas and creativity, more and more businesses are being started by women and minorities, who now account for more than one-third of all new businesses in the United States. What he is saying is that we aren't looking today at the mega-corporations or the super groups like GM, AT&T, ITT and those Fortune 500's, but we're looking at small businesses. And that led me to the realization that this Governor and his department of development understand that the focus needs to be on small business creation, revitalization and support. That is what I think Mr. Lorello will probably address.

But I think Annison's point is we're going through that third wave, so to speak -- that we've gone past the agrarian, we've gone past the industrial and we're looking now at an information explosion and we need to have and understand the technologies that go along with that.

So we come to the point of what Ohio is trying to do, and I would suggest to you that Ohio's Governor is trying to recognize such trends, is trying to anticipate what is happening -- not just this year or during the first term -- but during the rest of this century and into the 21st Century. We are, in fact, forward thinking, and I'm not attempting to give you a treatise in defense of the Celeste administration, but I feel the need to give you some reassurance that we aren't asleep at the wheel, that the ship of this state is not wandering aimlessly in the waters.

Again, I hope that Dr. Cetron in his need to provoke discussion, was talking about our previous governor because if not, I think he's done us a disservice. We feel that we've been very active and we feel our actions will indeed be a positive legacy for our children. We are working through this strategic planning process and it's not something abstract, it's not just an academic exercise for us, it's something that will be pervasive in state government as we move beyond the planning stages to the implementation stages. And some of this is happening simultaneously. Some of what is captured in the strategic planning documents are things that are currently under way, some have even been completed, but most of it is a long-range, forward-looking view of how we serve our citizens in this state for the next 20 to 100 years. And I think that kind of dedication to task is going to be well recognized in the long run, if not by those of us with shortsightedness and special interest. When this administration retires and we start looking at the things that have happened in this state in a few years, we'll recognize that at least we've been put upon the right path.

If I go into much more detail, I'm at the risk of pre-empting our

major presenters and they're the ones who have done the nitty gritty and understand very well what needs to occur in order for some of the things I've been talking about to take place. They will show you how this administration is trying to create jobs and is trying not only to attract new businesses but also to sustain old ones, recognizing that it's not a trade-off of smokestack industry versus some new high technology industry. We recognize that there needs to be a balance, there needs to be a blending, because you always go home with the person you came to the dance with. We just have to make sure that the shoes they're wearing aren't hurting their feet or pinching their toes. So that's what we're going to try and do today.

Without further elaboration, let me give you a little bit of background on Dr. Roberta Steinbacher, who is one of your own. Dr. Steinbacher is chairperson and professor in the Department of Urban Studies at Cleveland State University. She has an undergraduate degree, a Master's degree, and a Ph.D. in Psychology; she has taught in the parochial school system in Kansas City and was in St. Louis for a while and has also served as research psychologist and system director for the Ford Foundation's Project Bridge. Roberta joined Cleveland State University's faculty in 1968, and as you well know she's currently serving as the administrator which is almost the equivalent, if not a notch more, than director of the department. Dr. Roberta Steinbacher is the Administrator for the Bureau of Employment Services.

Ray Lorello is an action person. He is the person that Director Dietzel and others look to in terms of an economic development focus. Ray is either the Assistant Director or the Assistant Director for Business Development, or both. I think it's both, but so you won't be burdened with titles, let's say he's the Assistant Director of the State Department of Development. Ray certainly has a stellar track record when it comes to economic development and money issues. He has a background in business administration and he's one of Ohio's own. He's studied at Steubenville College and the University of Dayton (Go Flyers!) and the University of Nevada in

Reno and has studied economic development at the University of Notre Dame (Go Irish!) From 1977 to 1980 Ray was with the East Liverpool Chamber of Commerce, where he was instrumental in securing a $4 million grant to construct a port facility on the Ohio River and that was just one of his many accomplishments in that system. Ray came to my attention during the International Harvester situation, in one of those rare moments in history where an outgoing governor and an incoming governor were able to put something together that saved jobs and protected the lives and livelihoods of people; Ray was very instrumental there in Springfield. So there might be some kind of experiential remark he'll make because of his hands-on involvement. Raymond Lorello will talk about the economic development and job-creation side of the Strategic Plan.

So much will be said that it begins either to boggle or bore the mind -- I'm not sure which. But it's serious business and it's not the kind of entertaining presentation that can be made by Naisbitt or Annison or Dr. Cetron, because what we are talking about are things that we might pay a lot of money to fortune tellers and prognosticators to talk about but they don't do much in terms of the follow-through. What we will try to suggest to you today is that the follow-through is very serious business. We consider the gravity of the situation to weigh very heavily on our shoulders, and we have taken the challenge quite readily. I want to suggest that along with explosion we also need to be concerned with the imploding demands on our educational system as well. Everyone from Ronald Reagan to the teacher in the classroom in your district understands that education has come to center stage. The Governor has acknowledged in his State of the State address that education is a priority this year and for the future. What we are talking about is reform in the classroom; we aren't talking about revolutionary ideas, we aren't talking about what Dr. Spock has been able to do right. That was a revolution in child rearing. We aren't talking about any kind of revolutionary ideas. We're talking about the basic reformation and revitalization of our educational community, how we deal with our children. Everything, I believe, has come to a point, and that point is basically the model

of the country on the coin, e pluribus unum, if I can borrow a fragment of Latin. From all that has been presented over two days comes the single idea that what we need to do is assure a much brighter future for our children. As a member of the Governor's staff, as a president of a local school board working with talented individuals like Ray and Roberta, that's what we're all about, trying to insure that there is a future for all of our children -- not just one of survival but one of quality, one where excellence is the norm.

DR. ROBERTA STEINBACHER

Many years before he became Governor, Richard Celeste realized the strong linkages that were necessary between education and training, education and job service, and education and putting our people back to work in this state. Thank you for the opportunity to talk with you this morning about this very exciting topic.

Let me begin with a few words about the strategic planning process. Last January, Governor Celeste mandated his cabinet officers to put aside "business as usual" and reshape the entire process of state government policy development.

For too long, Ohio had set its priorities by focusing on the short term -- always taking the most expedient approach to problems and habitually putting out fires. This meant focusing on the current biennium and defining problems in terms of this year's budget. But the serious problems facing Ohioans cannot be solved by a day-to-day management approach. They are the result of a changing economy, an economy undergoing a restructuring as vast as the one which accompanied the industrial revolution.

The goal of the strategic planning process instituted by the Governor is to develop policy based on a clear vision of the future. We

need to ask where we want to go and what are the best ways to get there. Then we must coordinate policies with the budget to assign priorities and allocate resources.

This process forces us to identify problems, to set goals, to create a vision, and to determine where we want to be five, ten, and twenty years from now in this state. The strategic planning process allows us to develop policies and initiatives, and methods to evaluate them, within a broader context and with the aim of meeting the needs of Ohioans today and tomorrow.

This new process has not created a new layer of bureaucracy, full of planners and analysts building little empires. Instead, we have redirected the existing resources of the state.

We began with the way the cabinet works. A short time ago, the job of each cabinet member was to expand and defend the "turf" of his or her department; there was little interaction among departments. Today, cabinet members are grouped in clusters -- working teams -- which examine the issues facing the state according to content, not jurisdiction. The use of cabinet clusters allows the Celeste administration, and hopefully, future administrations, to evaluate the plans and programs of various agencies and units of state government, and to target the state's limited resources to the most needed initiatives.

I am the chairperson of the Cluster on Education and Job Training, which encompasses the Ohio Bureau of Employment Services, the Department of Development, the Department of Education, the Department of Public Welfare, the Board of Regents and the Rehabilitation Services Commission. For the first time in Ohio's history, all departments with any direct or programmatic commitment to education and training are working together and planning for the future. In this way, we'll maximize our resources and make sure we don't repeat each other's work.

The Strategic Plan itself will be issued in four volumes. The first, already published, was "Jobs and Ohio's Economy". The second, "Investing in Ohio's People", is in the final stages of review and a working draft will be available in the next few weeks. Two additional volumes will be issued later in the year: "Ohio's Environment and Infrastructure" and "State Government: Opportunities and Limitations".

The issue areas will encompass the major concerns and responsibilities of government in Ohio. Obviously, the volumes are highly interrelated and some initiatives will recur in several volumes. All of them will be developed within the following framework:

1. To use and protect Ohio's own resources -- human, economic and natural -- to the greatest extent possible;

2. To stretch state dollars as far as possible by leveraging them against both federal and private funds and by cutting the costs of government;

3. To emphasize community involvement in the delivery and control of services;

4. To replace Ohio's go-it-alone posture with a spirit of cooperation -- between Ohio and local communities, neighboring states, the federal government, and the international community;

5. To replace despair about Ohio's economy with the conviction that cooperation among business, labor, educational institutions and government can improve our economic conditions.

It is despairing to know that we had 512,000 people not go to work today because they couldn't find a job. But Ohio can, once again, serve as a model -- a model of economic revitalization and as a good place to live and to work.

Dr. Roberta Steinbacher

How do you fit in? The cabinet clusters have been working for months to develop the next volume, "Investing in Ohio's People", which will focus on Ohio's greatest natural resource -- its citizens. This volume will examine the networks of social service provision as well as the education and job training systems in the state. The initiatives will lay out a strategy for insuring that all Ohioans have the opportunity to receive the education and training necessary to find employment in today's -- and tomorrow's -- economy. The initiatives will develop strategies to insure that Ohioans who cannot currently be independent through their own resources receive assistance to move toward that independence.

Make no mistake: this won't be accomplished tomorrow and we have not deluded ourselves into thinking that it can be. But these initiatives <u>will</u> finally put Ohio on the road to strong recovery because the people of Ohio are involved in the process.

In our review process, we have explored literally hundreds of initiatives, constantly pruning and trimming to achieve what we believe is a package which combines vision and pragmatism.

The working draft which will be printed in the next few weeks will be circulated around the state. It will go to all the constituencies involved or affected by the initiatives in any way. Then during the month of May we will solicit their responses. The Cluster will carefully review and sift this input and make appropriate changes based on constituent response.

The final document will be published in June.

In the course of addressing the issue of job training and education, we have wrestled with some of the toughest questions facing Ohio, and indeed the nation.

Dr. Roberta Steinbacher

It is clear that many people today are dissatisfied with one or more aspects of public education and training programs. There is ongoing debate about whether it makes more sense to give our young people a broad background or to focus on specific skill training. At all levels of education and training we grapple with this question: how can we best prepare them to find employment when our economic experts cannot agree on the direction of the State's economy or the need for training in the future? How do we address the needs of hundreds of thousands of Ohioans who have lost their jobs and can never hope to regain them?

In trying to answer -- or at least begin to answer -- some of these questions we developed four major goals for education and training in Ohio: excellence; increased participation; firm links with economic development; and cost-effective management of resources.

The Celeste administration is committed to excellence in job training and education. It is determined to shape a new, positive image for Ohio's public schools, colleges and universities -- one that portrays them as resources, not problems.

As a first step, Ohio must adopt higher standards for students to strengthen their basic skills and prepare them to work and live in the future. While the exact balance is unclear, we do know that our changing society demands citizens who have been educated to think and to be flexible as well as to have specific skills. Employers tell us constantly that they will deal with job-specific training themselves if they can be assured that the training and education programs are providing the foundation upon which to build.

We must develop ways to upgrade the perception of the teaching profession in the public eye. Isn't it strange that our society is willing to entrust its children to teachers but, in public polls, does not accord those teachers high status? One of the results of that attitude is that school systems at every level are finding it more and more difficult to

keep good teachers. It is important to develop ways to recognize and reward the people to whom we entrust our nation's future. It is equally important to develop funding mechanisms which allow the improvement of teacher training programs and performance-incentive programs.

A complaint we frequently hear in our job service offices around the state is that the schools have fallen behind the tremendous leaps in technology and other advances in both the manufacturing and service sectors. The challenge we face is to insure that teachers maintain sharp and up-to-date skills and are able to teach their students using the latest equipment and techniques.

Obviously, one way to do this is to raise taxes significantly and thereby generate far more money than is currently available. Every one of you who has worked on a school levy knows that this option is not viable.

We need to turn, instead, to cooperation and linkage. If our school systems are to do their jobs, then we must expand and strengthen their working relationships with the business community and other resources in their areas. Let's explore ideas like equipment lend-lease. Are there ways that teachers can gain the experience of applying their expertise in other career fields -- and then bring that experience back into the classroom? Where are more opportunities for students to gain real-world experience? How can we better integrate those experiences into the curriculum?

What about our vocational schools? Are they training only for the short term? A recent column in Esquire magazine argued that the nation must learn a critical lesson from the current economic restructuring: we cannot afford to devote our resources to training people with skills which may well become obsolete in five or ten years. If we do, we will face today's crisis again and again. What are the links between our schools and the private sector, then, which help develop accurate long-range planning? Equally important, what are the skills our young people need to acquire to

become responsible and active citizens? We will do our state and our nation a great disservice if we focus all our education and training on narrowly defined needs of employers. Despite their critical role, jobs alone should not define our social well-being.

The answers to these questions must come from people like you. Each area of the State must begin to do its own strategic planning, as you in this conference are doing. We at the level of State government can define general directions and insure that local communities are given the leeway to create their own responses. But the real nitty-gritty work will be done by you -- you will be the source of excellence. Excellence is an honorable goal; but even excellence cannot solve our problems unless it is available to all our citizens.

A recent study by the Small Business Administration pointed out that the number of small businesses owned by women rose remarkably in the last five to ten years. But the business openings available to women were still concentrated in a few, traditional areas of service and retail. Why? According to the study, "Progress of women in new areas of entrepreneurship may be limited by differences in the educational fields of study and job skills of men and women. Relatively fewer women have educational backgrounds in the physical sciences, engineering and business." Similar deficiencies caused underrepresentation in managerial positions and highly technical and high-income sales jobs.

I am not trying to downplay the effect of sex discrimination in the workplace. But our education and training systems must bear some of the responsibility for channeling women into traditionally defined, lower-paying occupations. The same argument holds true for the ways in which many of those systems have treated physically and developmentally disabled persons, minorities and older workers. If Ohio's economy is to be rebuilt and revitalized, it must be done by including the entire work force, and not just selected portions of it.

This means that we must target certain populations within our state and ensure their access to necessary training and education. One frequent obstacle to access is money. That's why Governor Celeste announced a new program last week called the "Dislocated Workers Retraining Loan Fund", to be jointly administered by the Bureau of Employment Services and the Student Loan Commission. This fund will set aside close to $2 million for low-interest loans to be used for retraining. To be eligible, a person must be unable to receive other loans because of credit problems caused by unemployment, and must not be served by another state program. The loans will be targeted to workers over the age of fifty, workers unemployed for six months or longer, workers displaced by a plant closing and displaced homemakers. In establishing this program, Governor Celeste demonstrates Ohio's willingness to take a chance on its own people and to depend upon them as the basic resource of recovery.

But job training and education, even of the highest quality, cannot eliminate unemployment, poverty and economic decline. Standing alone, they do not address the root cause of our crisis: the real human resources problem in the United States today is that our economy has failed to generate enough jobs to absorb the skills of the work force.

No amount of training or education can make a dent when there simply are not enough jobs to go around. And to emphasize training and education in the abstract condemns the unemployed to a detour rather than a solution. It justifies joblessness as a price people pay for their lack of skills. It is the epitome of "blaming the victim" and increases the already heavy stigma of unemployment.

Successful training and education efforts will be those which possess strong job-securing or job-creating elements. That is why the Celeste administration is committed to linking its program for economic development closely with its training and education initiatives.

We intend to use Ohio's impressive human resources to take control of our economic destiny. The fact is that for every year from 1928 through 1990, human resources have been or are projected to be the dominant factor accounting for growth in national income. Improved job skills, the reallocation of labor and the enhanced quality of labor have consistently accounted for three-quarters of increased productivity since 1929.

The Celeste administration views its employment and training initiatives as long-term investments in the prosperity of our people. Like any other investor, we accept the responsibility to search diligently for the investment that will yield the best return. Economic development, education and job training will be equal partners in revitalizing our economy and getting Ohio back to work again.

Like any investor, we accept the responsibility of managing our assets wisely. Ohio has one of the largest human resource development systems in the nation. Diverse education and training is available through more than 700 county, city, joint-vocational and local school districts, 179 non-profit post-secondary institutions and roughly 200 for-profit post-secondary institutions. In addition, support services and training are provided through an array of federal, state and local programs.

Recognizing the complexities involved in the coordination of multi-million-dollar programs -- which must adhere to federal and state regulations -- the Celeste administration insists that existing resources be managed more effectively and efficiently. We will do this by strengthening planning and management, by coordinating diverse agencies, and by expanding public/private partnerships.

The Governor has appointed a State Job Training Coordinating Council to serve as his advisor on job training and education policy. Besides the duties that the law sets forth, the Governor has mandated it to ensure that all our programs are coordinated, that duplication of effort is

eliminated, and that the people who need help are being served.

We are working to increase cooperation between all the different regional programs that exist in the state. You probably know that most state programs have divided Ohio into different geographical service areas. If you've tried to work with a number of those programs, you also know that no two of them divide the state in the same way. We are working to break down any false barriers this has created. For example, the Bureau of Employment Services has just completed redrawing our district boundaries so that they better match the boundaries created by the service delivery areas of the new job training partnership program.

We are working closely with the Department of Education and the Board of Regents to explore whether the educational infrastructure of Ohio is being used to its fullest, and to explore ways to expand both use and access. As you can well imagine, these questions force us at the state level to take a hard look at what we have been doing and how we have been doing it. They demand that we question some of the basic assumptions used for years in Ohio. It is not a simple process or a quick one.

Today, I want to ask you to join us in this effort. The vehicle at this point is the second edition of the Strategic Plan. That's an important undertaking but it's the process that's more important -- the kinds of signals the State sends out that it wants the input of the people of Ohio. After this volume, we have to get on to the harder phase of implementation. We have recognized that to define a vision and then attempt to implement it means taking the risks involved in any new, innovative process.

Fueling the education explosion is a real challenge -- but is only part of our task. The far more difficult challenge is to harness the power of the explosion and use it to build a strong future for the citizens of Ohio. Answers to the questions I raised today must come from people like you -- committed citizens prepared to spend the time and energy to

tackle the hard issues. You must share with us what you know about the local problems and tell us how the State can provide assistance to your efforts.

I can guarantee that your suggestions in this planning process will be carefully considered as we continue to shape the Strategic Plan and, in turn, get Ohio working again.

G. Raymond Lorello

Thank you. You know, what economic developers do is kind of a mixed bag -- there is no real focus to economic development. I have yet to go through a project that has fallen within strict guidelines because in economic development you're dealing with people on a daily basis. People are different: they have different thoughts, they have different initiatives, they have different needs. And what we try to do in economic development is identify and coordinate and cooperate with the various agencies and influences that create an economic development deal.

When I was asked to address the group this morning, I was very pleased to do so for a couple of reasons. First of all, we like a platform to talk to, constituency groups; we like the opportunity to address what we consider to be vital links with the economic development perspectives. And secondly, it gives me an opportunity to demonstrate to what I consider to be a very influential group my pleasure as an economic developer who has been in the profession for some 11 years at working with a governor who has finally taken the opportunity to step back, to move away from the pattern of planning in two- to four-year political cycles, to accept a responsibility that has been given him by the people of Ohio, and to say, "we're not going to do business as usual." The Celeste administration has made it clear that we're going to step back, take a look at Ohio, see where it's been, where it is today and where it is going beyond the year 2000, and determine how we are going to get there. I did not

have the opportunity to listen to Dr. Cetron yesterday, so I can set that aside. I don't know what he said, but I know where we're going, and I know we're going to be working with the Dr. Cetrons of the world to implement our programs.

You have a copy of Phase I of the Strategic Plan for Ohio. It's not a political document. It's written by the people of Ohio. I want to talk today about that document, Toward a Working Ohio, and about the jobs-creation piece of this four-phase process. Dr. Steinbacher talked about Phase II which she is heading up, and which deals with human resources in job training and education. Let's talk about how that piece came together and what some of the initiatives mean, and what your responsibilities are as educators as you deal with our most valuable resource, Ohio's people. Your responsibility is to read that document, not to accept it totally but to absorb what it says and then gear your management style and your responsibilities to what people throughout Ohio have said they feel is the direction this state needs to move in. I want to emphasize that this document was written by the education community, by the labor community, and by the management community; we even got into the ecumenical community in certain instances to talk about this State and where it's going.

The first two sessions of this conference series you've completed, as I understand it, one covering socioeconomic and demographic changes and the other, looking at inate and artificial intelligence. Two very critical areas. You're talking about an educational explosion, you're talking about a technological explosion. There in a capsule is probably the biggest reason that we as a society, indeed as a nation, are in the throes of tremendous change. Because technology is changing so rapidly that it's very difficult for each of us to keep up -- whether you're an economic developer or an educator or a business person planning the next five years. So our challenge is how to get ahead of this thing called "technological change"; or if we can't get ahead of it, how at least to understand the implications and the impact of it on our daily lives. One woman that I met today mentioned that

all of you in this room will be going back to your respective places of work on Monday saying, "That was a great conference. There was a lot about the future and where we're going. But what do I do now? How do I handle the problem sitting on my desk today?" We hope to have you take a look at this plan because it says that the solutions to tomorrow's problems lie in our ability to deal with and to resolve the problems of today.

Change is healthy, but it's healthy only if it's planned. Cancer is a change in the body but it's an unorganized change; we all know what happens as a result. It's a very devastating disorder. But in planned, continuous change, the ultimate result can be very beneficial. So change is healthy, but in my opinion it's only healthy when it's planned for.

We need to identify what will happen in the future and determine how we can quickly and appropriately respond. Change is not easy in certain areas, and the better we are at adapting and responding to it, the more successful we will be at lessening the negative impacts of that change. Another important aspect -- and our Governor is committed to this -- is to take a look at the resources we have available to us and to use them in the most effective manner. And this plan talks about that.

So consequently we have put together a Strategic Plan of four phases. The first phase is the jobs piece, "Toward a Working Ohio". The second phase is the one currently under way, in which we take a look at the human resources in our educational community and all the pieces related to that. The third phase is going to take a look at our natural resources -- water, coal, gas, wood, and so on -- and at the infrastructure in this state, and I'll touch on that briefly. And finally the fourth phase will take a look at state government itself, and will ask how do we administer, and how do we become more efficient in dealing with all these pieces?

G. Raymond Lorello

Since I'm dealing with educators today, let's talk about education and the economic development scene. The plan contains many initiatives but since Dr. Steinbacher is with us this morning and since the Department of Development under Director Dietzel feels very strongly that we must tie our resources and our programs together, I want to touch on industrial training and the JTPA program and the Ohio Bureau of Employment Services and the question of bringing programs more in line with the needs of Ohio workers. We have a couple of constituencies out there that we're dealing with, the JTPA program being mandated from the federal level to the state level to the local level via the private industry councils that provide money for training and retraining of workers who have been dislocated, disadvantaged, and so on. Within the Department of Development we have what is considered a "customized" training program that has few guidelines attached to it as far as the type of employee we deal with and the type of employee the company must hire or retrain. Somewhere along the line there has to be an alignment of what the state can do to work with companies to provide for their needs and what our responsibilities are to the constituencies and all of the people of Ohio leveraging the resources that we have to help upgrade their skills and put them back into the work force. The second piece of the Strategic Plan will deal with that issue. On one hand we are challenged with creating the jobs of the future -- with expanding the employment base of Ohio. On the other hand is the challenge of how to retrain a 40-year-old steelworker who has 12 years in the industry, who has two children in school, who has a mortgage and two cars, and who will never go back to the steel industry again. And further, what do we retrain him to do? How do we help the communities on a local level identify their needs so that we can find additional places for these people to work? Those are the immediate problems. How do we align those programs so that one serves the needs of the other?

We are also looking at what we call the Ohio Technology Transfer Organization. This auto program is designed to search out for the small business community of Ohio technologies that may bring answers to their

production problems, or possibly their marketing problems or business-plan writing problems. This group is addressing the needs of the small business community, connecting them to a university base and to other significant data and information sources, to help them avoid re-inventing the wheel. The legislature at the Governor's request has recently expanded that. Thirteen two-year colleges had auto agents prior to July 1983. We now have auto agents on all 23 two-year college campuses in this state, and the legislature has provided the funding necessary to expand that program and make it productive. Along with that, we're looking at what's called the Tie In Program, which is an effort to coordinate research and development efforts in government, universities and the private sector so that companies looking for existing technology can find it. The Governor has also recognized coal research as a significant need in this state. We have tremendous coal reserves in Ohio. But we're all familiar with the acid rain controversy, and because of the high sulfur content of our coal we are unable to market it efficiently. The Governor has stated in federal testimony that Ohio recognizes the acid rain problem, and that this state wants the time to be the leader in coming up with solutions to its own problem. That is a significant commitment on the part of the Governor and his administration to identify a problem head on -- not to bury our heads in the sand, not to argue with the EPA, not to slow down the processes under which new technologies can be brought to bear to address a very significant problem. And he's saying we will address our own problems, and we're willing to work with the industrial community and the research community by providing some of the funds necessary to encourage research in the coal area that will help to resolve the problem that we have. We have all heard of projects started in the back rooms that help to reduce the sulfur content of coal, but have never been completed. The Governor is saying that we are going to take that initiative, we are going to work with the United Mine Workers of America, we're going to work with the industry that burns the coal, we're going to work with the research base that can do the work necessary to get the job done and we're going to solve our problem. That's significant.

Another critical step that has been taken -- and I'm fortunate to have it in my office -- is development of the Office of Labor/Management Cooperation. Ohio has a problem with its labor community, and it has a problem with its management community. The problem is that the two of them do not understand one another's needs. Cooperation between labor and management is a must. We've got to be able to provide for those in the negotiation process. And I'm not only talking about organized labor, ladies and gentlemen. Organized or not, labor has significant needs that management must understand; and there are significant responsibilities which labor must understand that management needs. The Office of Labor/Management Cooperation has the responsibility of bringing together the leadership on both sides of the aisle to talk about solutions to problems.

As an economic developer, I've had non-Ohioans tell my they don't want to work with the State of Ohio because there's bad labor in the state. When we can get them to the negotiating table, talk about their needs, and identify the educational base that's available to train or to generate skilled labor, it's incredible how many battles can be won. But that perception is the biggest problem we have. How many people are out there that we've never had a chance to talk with because of the perceived problem that we have? Nobody's perfect. We have problems in this State, just as any other state has. But what Governor Celeste is saying is that we're going to meet our problems head on. We're not going to turn our backs to them; we're going to recognize them and we're going to work with them. That's significant. I have yet to see a problem resolved when the factions involved with the problem walk away from one another. It's not going to disappear. We know in our own personal lives if we have a problem that if we don't sit down and resolve it with the parties involved -- whether it's our loved ones or coworkers or what have you -- it generally gets bigger and bigger. I like to use an analogy from when I was a young boy and did something wrong, and I said, "Boy, if my Dad ever found out I did that he'd kill me. I mean I'd be in big trouble; I might just as well resign from the face of the earth because Mr. Lorello, my Dad, is going to

bury me." Now when Dad found out about it, I was punished; but I'm 40 years old today and I'm working for the State of Ohio. I didn't die. It wasn't as bad as what my mind developed. I think we can all relate to that. We have a problem, but it's not as bad as people like to think it is. And we have companies and we have labor leaders in this State that are very aggressive in recognizing the need for change and doing something about it. The Office of Labor/Management Cooperation is designed to make information available to labor organizations and business communities that need it to set their own goals and courses for their companies. If we don't make these forward strides, we will continue to have a perceived problem in Ohio.

Gary mentioned that the small business community of Ohio is critical to our needs. There's a rule of thumb in economic development that says 80 to 85 percent of all new jobs created will come from companies with 25 or fewer employees, and that's true. What we really have to monitor are the birth rate and death rate, and we need a net gain in the birth rate. We can create small businesses all over the place. That's not very difficult to do. It's how long that business can survive and what we can do to help it survive that are critical. So within the small business division of the Department of Development we have created the Small Business Technical Assistance Center, which deals on a daily basis with the problems of the small business community. Within that center we're dealing with two significant initiatives. One is what we call our one-stop permitting process. It was interesting. This was triggered by an article that Governor Celeste read in the Wall Street Journal about July or August of last year. The Governor called Director Deitzel and said, "Al, there's an article in the Wall Street Journal this morning that says Ohio is one of the worst states in the union to start a business in. According to the article, you people require 19 different permits just to start up a business. I want that changed." I don't know how many of you know Al Deitzel, but when Governor Celeste said to the Director, "I want that changed", and Al set his mind to changing it, a lot of people were moving and shaking in a very

short time. As a result, we now have in place in the Department of Development's small business division the one-stop permitting center. We don't have 19 permits -- at last count it was 350 and rising. But this office has the ability to scan all state agencies to identify what permits are necessary to what business, and to concentrate that information in an area where a small business person could call or walk in and say, "I need to expand," or "I want a new product line -- what permits do I need to do that?" This office is now able to identify the permits and to walk people through the process. It has been tremendously well-received on the part of the small business community of Ohio. It is a significant move in the right direction of streamlining, making us more efficient and more responsive to the needs of the business community of this state. It went from 19 in an article in the Wall Street Journal to 350 plus, but now we have some focus. We have a place in which the small business community of Ohio can get the assistance it needs. That was one step.

Another initiative which has significant impact not only on the small business community but also on the community at large is what we call our small business enterprise centers. These are programs that are coordinated and worked on by the communities themselves. All we are doing is providing some technical assistance in how the project can be put together and providing the mechanism through which the small business enterprise center director can access the various services offered by the State of Ohio. It's in conjunction with what we're calling the networking process. Let me give you an example. All of you live in communities. Suppose you were travelling back to your community on an airplane and somebody sitting next to you said, "I'm on a search to find a new location for my facility." Or suppose you're in a conversation with someone from your community who says, "I need to expand my facility". They want to buy new equipment, put 10,000 square feet on, whatever -- but they need to do something from an economic development standpoint to expand operations to create more jobs. Is there a place in your community that that person can go for the assistance necessary to do that economic development expansion? Some

communities have such a place, and some don't. If yours does not, then the responsibility of the small business enterprise center and your responsibility as an educator is to encourage and influence and take part in the creation of such a mechanism on a local level that will provide the information or resources to do what's necessary to make an economic development activity happen. We can't do it all on the state level. There's no way we have enough people power to go to all the communities of Ohio and do economic development activities for them. There's no way I can address a City Council at St. Clairesville, Ohio to help them change an ordinance to help this company grow. There's no way that I can come to Cleveland, Ohio and sit down with the planning commission to re-route a road to help an economic development program happen. There's no way I can go to Mt. Vernon, Ohio and work with the County Commission or City Commission on trying to develop a tax abatement program. The Department of Development does not have the human resources to do this. It has to be done on a local level. You have to have mechanisms in place which will address the economic needs of your community. You have to know what your community needs are, you have to know what your business community needs are and you have to know whether your financial institutions are willing to get involved.

You're probably sitting there saying, "I'm an educator, that's not my responsibility." It is your responsibility. When I worked on the local level the educational community was one of the key ingredients to all my committee functions, to all my programs; because I can't do a thing to help somebody expand or create a new job unless I can demonstrate to them that the community has the ability to educate the work force that they need or has the ability to educate the young people of the work force that would be coming in. That employer must believe that the community has a good school system. It's all a part of things, ladies and gentlemen. The educational community doesn't sit there by itself, the business community doesn't sit there by itself; the labor community, the public community, the public sector, elected officials -- we're a community. It's exactly what the word says. We all have a piece of it and our challenge is to climb into the

other person's head a little bit and work with him to understand. You know the Indian saying -- don't judge a man 'til you walk a mile in his mocassins. It's true.

I try to make Ohio very attractive to outside industry. That's my job. But I'll tell you who are the best salespeople I have: the people who live in the community. I go out and tell a company, "Boy Ohio's a great place in which to locate." I'm paid to do that. That's my responsibility, and the person I'm talking to recognizes that. But if I can put a phone book in front of them and say, "You pick out the company CEO you want to talk to", let them pick the person and then they sit down with that CEO and he or she says, "This is a great community. This is what they did for me, this is what's going on to help me meet the needs of my company", that says more to that outside person than all of the literature and all of the money I can put on the table and all the encouragement that I can give them. Where does that come from? It comes from the local community addressing the needs of the business community. It's a give and take process. I'm not saying give away the store. I'm not saying let companies go and do whatever they want to do. It goes back to my original statement: Change is good if change is planned. And companies recognize that they need to work within the guidelines. They will try to bend them as far as they can because to them that's money. And it's not a we-and-they situation; it's us, so we all work together.

Gary mentioned the International Harvester deal. I had 18 people in Springfield, Ohio in the SPER program -- Supportive Programming for Expansion and Retention. It was a cross-section. I had educators -- in fact the Superintendent of the joint vocational school was one of the key ingredients in that whole thing; insurance people; manufacturers; what have you. With those 18 people in just a little over three years' time we did over $33 million worth of financing and can document the creation of over 1500 jobs. Simply because we had people talking with people and we had the ability to address needs in a planned atmosphere for the companies in Springfield and Clark Counties. What did that lead to? That led to the

International Harvester project -- at that time and I think still the biggest purchase/lease back in American corporate history. If it hadn't been for Governor Celeste's and Governor Rhodes' joining forces to make this happen and getting the State support behind it, it would not have happened. But it also would not have happened if the local community had not acted together. We had labor, business, finance, and the educational community all working together to put that together. Who would have been most affected if Harvester had shut down? The educational community. The dollar impact on that community would have been devastating. Reduction in real estate values. Loss of income tax. Other companies moving out. It would have been incredible. What we did was work with the educational leadership in that community to quantify that impact and we went back and said to Harvester, "We're going to put together a package of $30 million to purchase your plant and lease it back to you. That injected the company with some working capital, and it gives us some strength because Harvester has the world's most modern truck assembly plant. If Harvester went belly-up, somebody would use it. Today 3500 to 4000 people who would have lost their jobs are still at work; their order board is up, their stock is up, and the company is coming back. We put some faith in that company's leadership and their ability. There were some changes in the upper-level leadership. The labor community was part of it. We kept them together. United Auto Workers -- a tough organization to work with, good, sound, solid people -- they wanted to be a part of it, they wanted their feelings known and they were known. They were recognized by labor and management and everybody else involved. That community will take on anything today, because they're winners and everybody wants to be a winner. But it was done through a networking process on a local level. It was not the State of Ohio coming into Springfield and saying, "We're going to save International Harvester for you." It was the community of Springfield going to International Harvester and the State of Ohio saying, "We need your help." And that's what we do: we help. So the small business enterprise centers are a very significant initiative that we're taking and education is an absolutely critical part of that on the local level.

Another thing we're looking at that helps to address some of the job creation potential in this state is the expansion of our international trade program. We're no longer in an American economy. Particularly in the steel and automotive industries, we are in an international economy. And I think all of us can recognize what has happened to both of those industries as a result of foreign influence in the domestic market. But we have to recognize that America is still the world's leader in producing all types of products, and there's a big world out there -- they need what we have to offer. All we have to do is offer it competitively.

Our international trade division is geared up to address the world as a marketplace. They have divided the globe into geographic locations and are putting in place the type of people who understand the international market. I don't know how many of you have traveled internationally; I had my first opportunity in 1980, and I have never had my eyes opened wider than when I'm dealing with the international client. People are people, but not all people think alike -- their cultures and their backgrounds are different. And if you really step back and look at the situation, you can understand why Americans are not too well liked in some places. Not because we're hard people or pushy people, but because we're free people. I mean truly free people, and that's very hard for the Europeans and some others to understand. It's very hard for them to comprehend that we can travel 3000 miles and speak the same language, use the same monetary system, and have the same political ties and political structure. They go 50 or 175 miles and may change cultures three or four times. It's incredible. Are they right or wrong? Are we right or wrong? No. We're people. But we've got to understand that the young people of Europe often speak three or four languages, whereas if you don't speak English in America, we don't want to work with you. That's crazy.

So the Governor has said to our International Trade Division, "Let's look at the world globe, and let's put people to work who understand,

who have had experience and know the cultures of these parts of the world."

I think we need some national policies to change a lot of this. One thing I notice as an economic developer is that in a lot of countries a bribe, as we know it in this country, is a normal mode of doing business. Our companies are restricted from that type of activity on the international market, although other international companies are doing it. Are we at a disadvantage? Yes. You know it's not only high labor costs and all those other things that people talk about. The big problem is that we really have not entered into the international market as an international market. We try to make everybody play by our rules and we try to play by everybody else's rules, and it doesn't mesh. We don't join rules. And we're not allowed a free trade. Our industrial community can be competitive with any other country in the world. The problem is that we're not competing on a free basis. We have to do things to change it. Our Governor has taken some initiatives through the Great Lakes governors and made a point to get our message across because who else has been impacted more heavily than auto and steel -- this region -- by what's happening in the international market? The Governor had an opportunity a week or so ago to talk with a leader in the steel industry. It was amazing to watch those two individuals interact because they're thinking alike. When the Governor says it's a world market, he means it. It's time we became cooperative. And the steel leader was saying, "Yeah. You're right, Governor. We can't fight them any longer; let's join them." And he's working on a merger with the Japanese steel industry to produce, to coat, value-added steel in this country. Is it an American work force? You bet it is. Is it organized? You bet it is. Is it productive? It will be. And what we're hoping to do is get that facility in Ohio. It's a significant departure from the traditional steel industry mode of "we don't want to work with them."

Now it's going to take some time but I think the direction is accurate. I think in certain industries we have to join forces. The Governor has been working very closely with the Honda Corporation. Is

it an American work force? You bet it is. Are they productive? Just as productive and just as efficient as the Japanese work force. Does it mean a lot to the State of Ohio? Yes it does. These industries are world industries, not American industries to do with as we will. And we see more and more of it coming and we have to be in tune with that type of change.

I mentioned a little earlier about the European student knowing two or three or more languages and I think we need to do that. I remember when I was going to high school I had to take Latin. They kept telling me that the exercise of taking Latin was good for me. It wasn't the use of Latin they were concerned with but rather the discipline to train your mind. Over there they study English and French; we offer them too, but we make them elective, rather than mandatory. And those are some of the changes that we have to take a look at. I think it's coming but we have to do more. We have to understand that it is a world economy. We have to give our community that skill.

Another significant program that hits at the heart of what your session is all about is the Thomas Alva Edison Partnership Program. This program is designed to address the innovative and creative juices you people generate on a daily basis. The Governor is committed to technology and entrepreneurship and creativity. But this is a partnership program, which was created to encourage development through technological innovation. The Governor has set aside $32.4 million to provide matching funding to foster cooperative research and development efforts involving businesses and educational institutions that will lead to the creation of jobs in Ohio. The Edison program operates through our Department of Development. The Industrial Technology Enterprise Advisory Board is a bipartisan group of legislators and seven private citizens who assist our director in administering the program and in identifying the projects that will be supported. Those projects are in several categories. First there is a search for innovative technology. This program is designed to help organize and establish a structure within participating universities and colleges that will identify,

evaluate and document the commercial potential of their technology assets. The program will operate on a pilot basis and will provide funds and assistance to certain interested public or private educational institutions in Ohio. The objective of the program is to encourage the eventual transfer of these newly recognized technologies to the private sector either for the start-up of a new business or as additions to product lines of established firms. In other words, we're going to work with universities, provide some funding to learn what their professional staffs are doing, to find out what pieces of these have commercial application and then to encourage that commercial application through research and development and then spin it off and create jobs.

Control Data does this very well. They did some research on their company and had spun off at last count 16 smaller companies from the parent corporation. They put seed money into it and encouraged the people with the creative ideas. Hewlett Packard is another one -- they started in a garage. Two people from Stanford University started fooling around with a little chip and look what grew out of that. Same concept.

The Innovative Research Financing Program will provide matching capital to support cooperative university/industry applied research and development activities. The funded research projects must be cooperative efforts involving an industrial co-sponsor and a researcher associated with an Ohio public or private institution. The co-sponsors must maintain a relevant business facility in Ohio and must contribute to the project an amount at least equal to that requested from the State. State assistance will come in two types. One is for early stage feasibility research. The proposals in this class will be directed toward determining the technical feasibility for commercialization of ideas and the projects will involve feasibility-related experimental or theoretical research on an innovative idea. These projects will include investigations at the cutting edge of technology. Funding for this type of research will be available in amounts of $50,000. It's a matching program, so you can put a minimum of $100,000

toward basic research. The second type of assistance will be for advanced applied research projects. These proposals should result in measurable technical objectives such as the development or refinement of a laboratory prototype. Proposals in this class will deal with the application of technology in the development of proven concepts toward commercialization. The funding for this type of research will be available in amounts up to $250,000.

And finally there are the Advanced Technology Application Centers. Ladies and gentlemen this can be incredible. When the Governor and planners looked at Ohio it kept coming to the surface that individually our universities cannot compete with a Stanford or an MIT. But collectively, we have in Ohio a university base, an educational base, that can compete with anybody. We've got significant programs going on in various geographic areas. There are robotics and microelectronics developing in the Cincinnati area; there's the advanced manufacturing process around the Dayton area. You get into central Ohio and in and around Columbus and you've got hardware and software and laser manufacturing; you come up to the Akron area and you've got polymers; and up here around Cleveland there is the biomedical and medical, and again the advanced manufacturing process. So there are clusters of strengths in various geographic areas. There's no reason why polymer creation should go on in Cincinnati when so much of it is going on in the Akron area. Through the Advanced Technology Application Center the State will seek to encourage the formation and growth of several major world-class technology research development and implementation centers. Through a challenged grant competition the State will select for funding Advanced Technology Application Centers with a demonstrated capability to be or to become a national or international leader in one or more fields of technology. Regionally based, each center will be involved with local academic government, economic development and business interests. The selection of the groups of technology is focused on where such a center should be, based on the region's existing strengths and resources, both academic and private. The Center must be able to demonstrate how the quality and focus of its research and development program will help to create jobs in Ohio through stimulating new technology

and businesses, helping existing enterprises become more competitive and acting as a magnet to attract out-of-state and foreign businesses. We're going to put about $2.5 - 4 million into this effort to try to encourage the creation of the application centers.

I mentioned earlier that technology is moving so rapidly that it's difficult for all of us to keep up with it. The best way for me to illustrate that is by a story I think most of you are familiar with. This is the story of research dealing with the computer application to the paraplegic being done by Dr. Petrowski at Wright State. I remember sitting at home when CBS news reported what Dr. Petrowski had developed. A young lady who had been involved in an automobile accident the night of her graduation from high school had been paralyzed from the neck down. She went to Wright State University as a student and became, for lack of a better term, a guinea pig for Dr. Petrowski's experiments. Through his efforts, this young lady was able to walk again. He was able to motivate her severed nerve endings by computer application. Her muscles were still intact, and with that computer he was able to stimulate her muscles, and she was able to get up out of the sling with all of these wires around her and take three to four steps. Behind her was the computer that helped do this and it was almost as big as this projection screen beside me. Ninety days later when that young lady walked to the podium for her graduation from Wright State to receive her diploma, Dr. Petrowski was holding the computer in his hand. Through further technological experience and experimentation, we're going to be able to take that computer and implant it as we do pacemakers and these people will be able to walk. That is absolutely incredible.

What is the commercial application of what he is doing? How many paraplegics are there in this world? How many people would be needed to assemble the small computers and the components that go into them? How many people can be put to work, not only in Ohio but worldwide, as a result of what he and his fellow researchers are doing? That is our challenge.

We need to take the efficiency and productivity of new technology and adapt it to our basic production skills and production needs. I say to you that if we let the commercial production of what Dr. Petrowski and his fellow researchers are doing in Dayton get out of the State of Ohio, then we all have failed. Because as Governor Celeste has said so often, for too long the educational community of this State has developed and molded minds that go elsewhere to find work. I say to you that we're not going to let that happen any more; that through technological advances, through working with the educational community and through working with the various segments of the community to identify what these growth needs are, we as a community -- the State of Ohio and the various cities and villages and townships and counties within this State -- are going to address our own needs, solve our own problems, and put our people back to work.

FUELING THE EDUCATION EXPLOSION

Participating Organizations

Akron Public Schools
Bay Village City Schools
Beachwood City Schools
Berea City Schools
Canton City Schools
Cincinnati Public Schools
Cleveland City Schools
Cleveland Foundation
Cleveland Heights-University Heights City Schools
Cleveland State University
Columbia Schools
Cuyahoga County Board of Education
East Cleveland Schools
Elyria City Schools
Erie County Schools
Euclid City Schools
Fairview Park City Schools
First Congregational Church, Akron
The Foundation Center
Gahanna-Jefferson City Schools
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John Carroll University
Kent State University
Lake County Schools
Lorain County Community College
Marion City Schools
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Orange City Schools
Painesville City Schools
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Pickaway-Ross Vocational Center
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Richmond Heights City Schools
St. Joseph's Academy
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Shaker Heights City Schools
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Solon City Schools
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South Euclid-Lyndhurst City Schools
Southwestern Schools, Grove City, Ohio
Toledo City Schools
Tri-County JVSD
University Circle, Inc.
Upper Arlington Schools
Vandalia-Butler Schools
International Platform Association
Premier Industrial Corporation

CLEVELAND HEIGHTS-UNIVERSITY HEIGHTS SCHOOLS

Widely acclaimed for its academic programs, Cleveland Heights-University Heights perennially places among the top ten districts and private schools in Ohio in the number of National Merit Scholarship semi-finalists. The district's music program is well known, and more than a dozen Heights High graduates are now with symphony orchestras. The district offers an integrated, structured program for gifted and talented students from pre-school through grade twelve.

The schools enjoy outstanding community support, with the second highest property tax rate in Cuyahoga County. The racial, ethnic and religious diversity of the district is emphasized in the high school's multi-cultural center, which brings in dignitaries, resource people and displays in an effort to promote understanding and appreciation of one another.

Other programs include an elementary "magnet" school featuring individualization with emphasis on math and another magnet featuring traditional education with emphasis on French, Spanish and computers; an alternative school program at the high school for students with "freer" learning styles; programs within the district and in cooperation with other districts for vocational education and education of the handicapped; a wide range of sports and extra-curricular activities; pre-school programs through the Community Service Department; extended kindergarten, an all-day program for the children of working parents; and a comprehensive adult education program.

The district serves University Heights, most of Cleveland Heights and a small portion of South Euclid; 1 high school (grades 10-12), 3 junior highs, 10 elementary schools; enrollment 8,500, modest decrease over next five years; 400 teachers; pupil-teacher ratio approximately 20 to 1; 72% of graduates go to college.

OHIO SITE, EDUCATION POLICY FELLOWSHIP PROGRAM
Institute for Educational Leadership

The Cleveland program is the first urban, non-capital EPFP site and is funded by the Cleveland and George Gund Foundations. The site was established in 1976 and is designed to strengthen educational leadership in local school districts, human services agencies, and institutions of higher education.

Twenty-two Fellows participate in the 1982-83 program and represent a broad spectrum of city, county and state agencies as well as private organizations. The list of sponsoring agencies is impressive: seven public school systems (Berea, Cleveland City, East Cleveland, Cleveland Heights-University Heights, Euclid, Nordonia Hills, Vandalia-Butler), Cuyahoga Community College, Western Reserve Academy, Lorain County Community College, Case Western Reserve University School of Medicine, The Foundation Center, Federation for Community Planning, Office on School Monitoring, Ohio Department of Education, the U.S. Navy Finance Center, and the Cuyahoga County Board of Education.

The education component includes sessions on foundation support for education and educational change and on the policy process as viewed by advocacy groups, administrators, public servants and the business community. Other themes include issues of higher education design, school desegregation, women in leadership roles, delivery of human services and the politics of education.

Training activities include a site visit to Columbus to study the legislative process and the perspectives of legislators on education issues. In addition, EPFP hosts several seminars annually to provide the current Fellows with an opportunity to meet the Cleveland alumni/ae and to discuss policy issues with Cleveland sponsors.

The Cleveland site is affiliated with the Shaker Heights City School District. The Ohio site coordinator is Dr. Mark Freeman, Director of Research, Development and Evaluation for Shaker Heights City School District.

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Cleveland State University

College of Education

CENTER FOR THE STUDY OF INDIVIDUAL DIFFERENCES IN LEARNING AND INSTRUCTION

The Center for the Study of Individual Differences in Learning and Instruction was established in 1980 within the College of Education. It functions as a forum for bringing together College and University Faculty with interests in the cognitive, affective, social, and physical differences between learners that influence the nature and effectiveness of their educational experiences. Issues identified for emphasis may be based in a single area of study or may be interdisciplinary in character, may vary on the continuum of basic to applied research and may variously combine programmatic research, evaluative, and developmental emphases. A special focus is directed toward study of those problems characteristic of the urban environment. Proposal preparation this past year has involved comparative study of the consequences of stress among learning disabled, gifted, and typical children; the evaluation of gender and culture fairness in microcomputer educational software; implementation of the effective schools literature; and a computer camp for gifted and talented junior high school students.

The Center is a loosely coupled organization designed to provide leadership in the delivery of support services to faculty. The Center is not an administrative unit but carries out its activities within the existing departmental structure. Sponsored activities this year included a series of seminars in the new methodology of meta-analysis as well as a colloquia series featuring faculty research on such topics as feedback in counseling, learner performance across the life cycle, learning profiles of low birth weight children, and reader literary response patterns.

UNIVERSITY CIRCLE, INC.

University Circle is a unique blend of cultural, educational, medical, religious and social service institutions situated on five hundred acres of Cleveland's East Side.

University Circle Inc. is the planning arm and catalyst for the Circle. It accomplishes tasks no single institution could do on its own-it derives its strength from the organizations it serves. Its commitments include planning and area development, acquisition and improvement of property, parking and busing, public safety and security, community and institutional relations and the preservation and enhancement of the Circle's natural beauty.

A part of what we do is to help school districts develop their concepts into programs.

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The Crawford Auto and Aviation Museum
Cleveland State University

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